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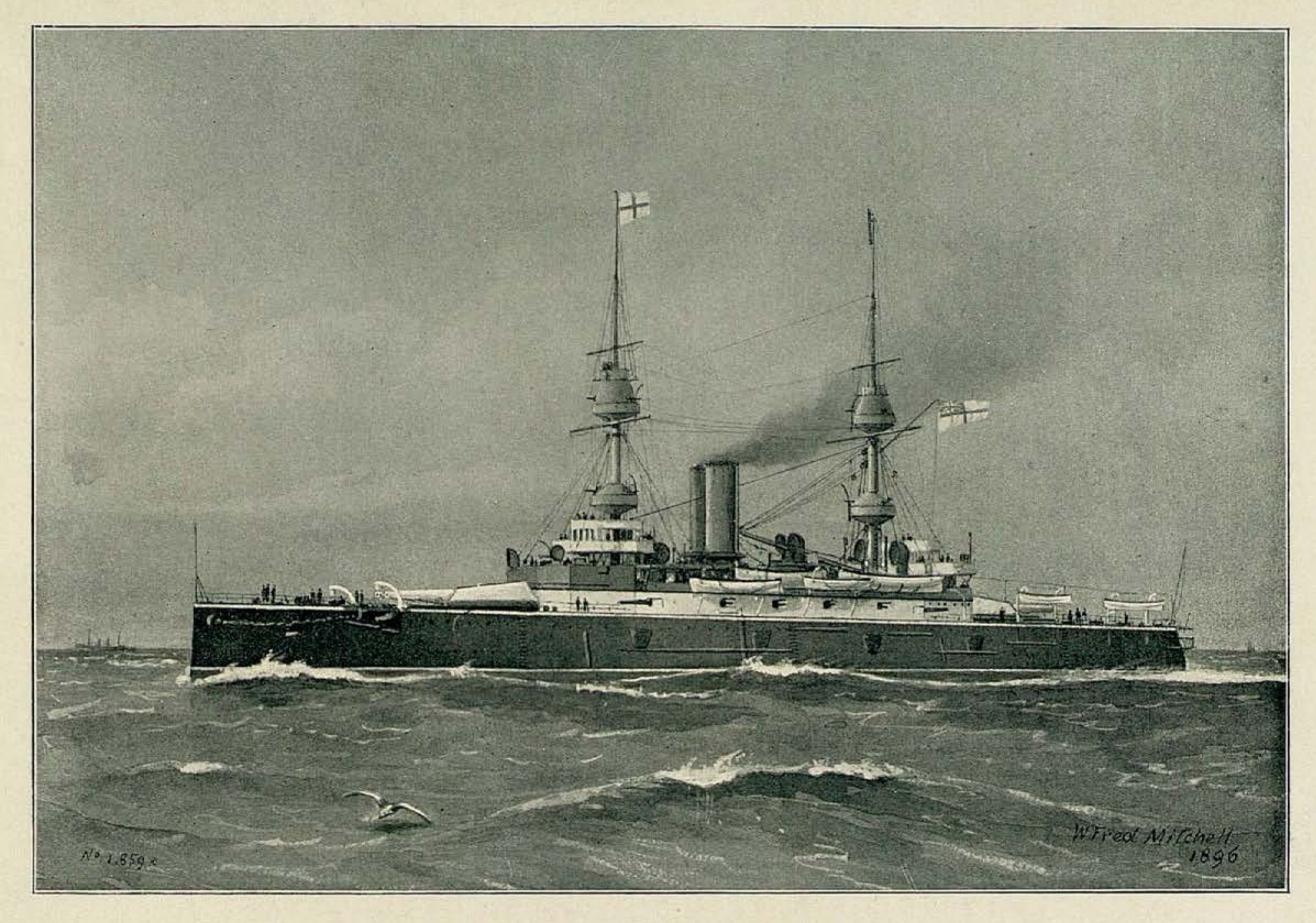
T. A. BRASSEY

1896

TENTH YEAR OF PUBLICATION

J. GRIFFIN & Co. PORTSMOUTH





H.M.S. "MAJESTIC."

THE

NAVAL ANNUAL,

1896.

EDITED BY

T. A. BRASSEY.

[illegible] R. H. BACON, R.N.; Captain C. ORDE [illegible]; Messrs. G. R. DUNELL, C. GLEIG, and [illegible]; "JACK LA BOLINA," and the EDITOR.

[illegible] C. N. ROBINSON, R.N.; J. LEYLAND; [illegible] M.I.N.A.

[illegible] ORDE BROWNE, late R.A., Lecturer on Armour [illegible] R.A. College.

[illegible] IV.—OFFICIAL STATEMENTS, NAVAL ESTIMATES, and STATISTICS.

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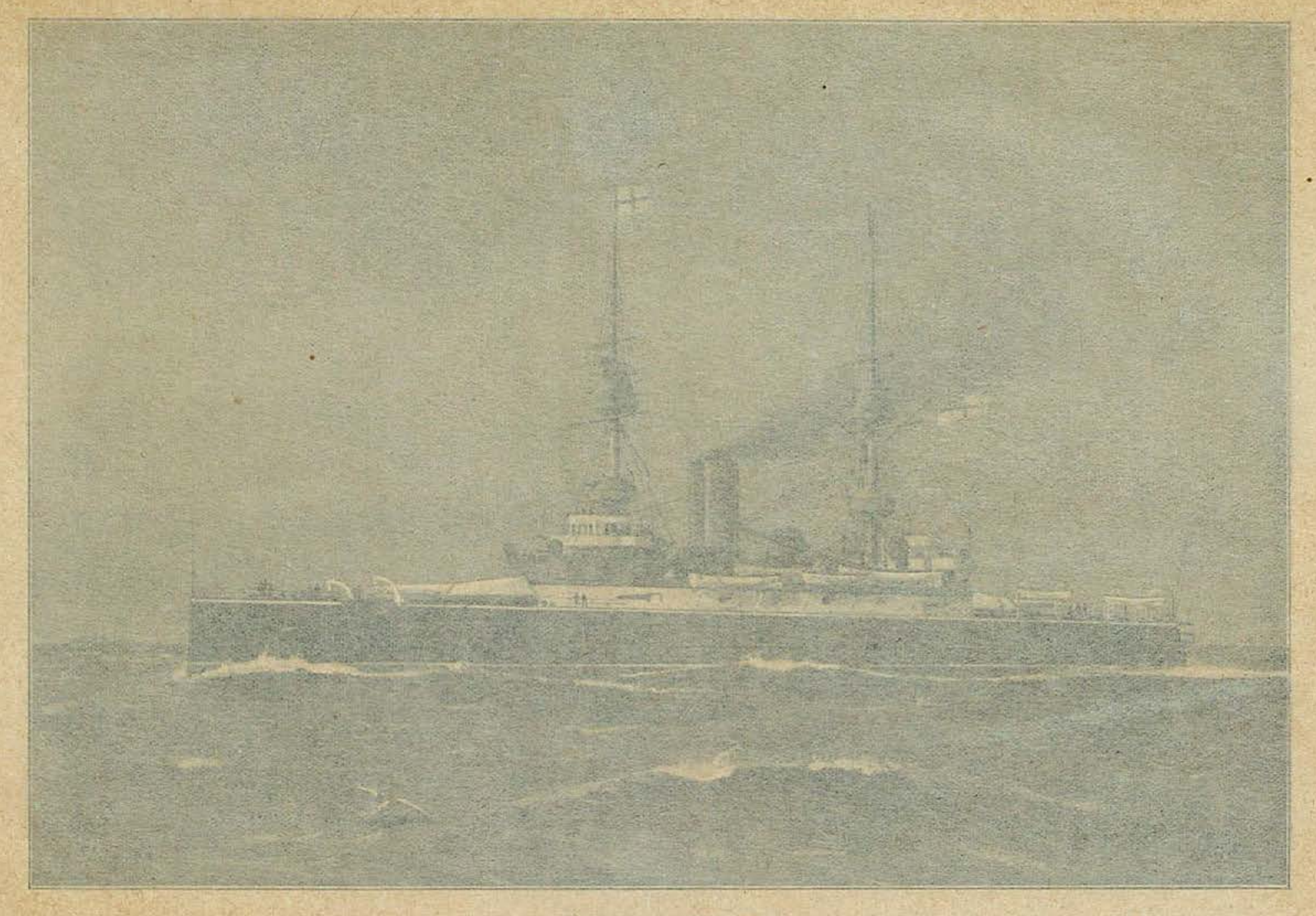
J. GRIFFIN AND CO., 2, THE HARD.

([illegible] APPOINTMENT TO HER MAJESTY AND H.R.H. THE DUKE OF EDINBURGH.)

London Agents: SIMPKIN, MARSHALL & CO.

Foreign Agents:

PARIS: BOYVEAU & CHEVILLET, 22 RUE DE LA BANQUE.
NEW YORK: VAN NOSTRAND. BERLIN: W. H. KÜHL.
HONG KONG, SHANGHAI, AND YOKOHAMA: KELLY, WALSH & CO.
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LONDON:
PRINTED BY WILLIAM CLOWES AND SONS, LIMITED,
STAMFORD STREET AND CHARING CROSS.

PREFACE.

It is ten years since the first *Naval Annual* was published. The originator of the work has been called by public duties to our Australian colonies, but it is the intention of his son to carry on the work to the best of his ability and on his own responsibility. It was Lord Brassey's aim to collect in a convenient form reliable information as regards our own and foreign navies, and to make the *Naval Annual* a record of the naval events of the year. It was designed mainly for the use of naval officers, and for that reason the price has been kept at an unremunerative figure. We trust that it has filled its purpose as far as they are concerned; but if it has only succeeded in inducing a larger section of the British public to take an intelligent interest in naval matters the trouble spent upon it will not have been in vain.

Mr. Barnes, who has had charge of the tables in Part II. since the commencement, has been compelled on account of ill-health to relinquish this arduous work to Commander Robinson, but he still remains responsible for the plates of ships. The torpedo-boat tables originally prepared by Mr. Laird-Clowes have been revised. Captain Orde Browne is still responsible for Part III., and in conjunction with the Editor has prepared a paper on recent war-ship construction. Mr. Thursfield was prevented at the last moment by serious illness from giving us his able assistance in describing the manœuvres; this work has been undertaken by Mr. Gleig. A new feature in the *Naval Annual* of 1896 is the detailed description given of the administration, *personnel*, and *matériel* of the French Navy, by M. Weyl, and of the Italian Navy by "Jack la Bolina," a well-known Italian writer on naval subjects. It is proposed to deal with other navies in future years in the same manner. Our other new contributors are Mr. Dunell and Commander Bacon, R.N.

We have been encouraged by the favourable reception of the *Naval Annual* of 1895 to double the number of our illustrations. With regard to these it may be observed that for some years past, in order to secure accuracy, no illustration has been published in the *Naval Annual* unless we have previously obtained a photograph of

the ship to be illustrated from standard naval photographers or official sources. It is for this reason that the appearance of our illustrations of ships are delayed till the ships are practically ready for sea. Mr. Mitchell still continues to be mainly responsible for this department.

The Admiralty have been good enough to furnish us with drawings of the Powerful and Diadem classes. The naval gathering at Kiel was an invaluable opportunity for revising the plates of foreign ships, and many slight errors have been removed.

We have to thank many shipbuilders for courteously supplying us with information. The Press, both English and foreign, have been as usual of assistance in the work of compilation; but where official sources of information are unavailable, the task of the Editor in deciding between the conflicting statements of unofficial authorities is not an easy one. We regret that an error in the particulars of the trials of certain Italian cruisers should have given trouble to the constructors of the machinery. To the compiler of the Naval Notes in the *Journal of the United Service Institution*, to the editor of *Le Yacht* and to the *Pola Marine Almanach* we owe an especial debt of gratitude.

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PART I.

CHAPTER I.

Progress of British Navy.

The clouds which have passed over our relations with foreign Powers during the past year have done good service to the British Empire in one respect, at any rate. They have compelled British citizens, not only in the Mother Country, but in the Colonies, to recognize the vital importance of the British Navy to their security, and to appreciate the value of the efforts that have been made by successive administrations under Lord George Hamilton and Lord Spencer to bring the Navy up to a standard of strength sufficient to secure for this country the command of the sea. It is certain but for these efforts the rumours of war would have caused serious apprehension throughout the country, and that it is owing to them that public confidence in the strength and stability of the British Empire has not been shaken. All those who have for many years past been urging the needs of the Navy on the attention of the public, must be sincerely gratified at the prominence now given to naval subjects in the Press. Public opinion appears to be unanimous that at all costs our command of the sea must be placed beyond dispute.

New Construction in 1895–6.

The Navy Estimates presented to Parliament in March, 1895, proposed an expenditure of £5,700,000 on new construction—a sum considerably in excess of what had been spent in previous years. As a result the year 1895–96 has been remarkable for the unprecedented activity in shipbuilding, displayed both in H.M. dockyards and in the private yards, more especially in the former. In both the rate of construction has been very much accelerated. Portsmouth and Chatham have achieved a feat, of which the country may well be proud, in completing two battleships of 15,000 tons within two years from the date of their commencement. The seven similar battleships of the Spencer Programme and the Renown, as well as numerous cruisers of various classes, have also been pressed rapidly forward. Several cruisers have been laid down. A large number of torpedo-destroyers have been completed, and several of increased speed have been commenced. The output of

each of the Royal Dockyards for 1895 and the preceding years is given in an interesting table in the *Naval and Military Record* :—

THE OUTPUT OF EACH DOCKYARD.

	Portsmouth.		Chatham.		Pembroke.		Devonport.		Sheerness.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
1895	2	29,800	2	20,500	1	12,350	3	7,700	—	—
1894	1	5,600	1	14,900	1	1,070	3	3,210	2	1,920
1893	1	4,360	2	5,430	2	8,720	3	9,530	1	4,360
1892	2	18,200	1	10,500	1	14,150	1	4,360	4	3,240
1891	2	21,850	3	24,900	1	14,150	1	3,600	1	3,600
1890	1	2,575	1	1,340	1	2,575	3	12,500	2	1,470

The following table gives the total for all the yards, with the total cost and cost per ton :—

VESSELS LAUNCHED FROM ROYAL DOCKYARDS.

	No.	Total displacement. Tons.	Total cost completed. £	Cost per ton. £ s.
1895	8	70,350	4,390,691	60 19
1894	8	26,700	1,803,576	67 10
1893	9	32,400	1,729,451	53 0
1892	9	50,450	2,920,431	58 0
1891	8	68,100	3,847,596	56 10
1890	8	22,520	1,230,913	49 0

It is very satisfactory to have from the *Record* (a paper which is not backward in championing the grievances of dockyard workmen) such testimony as the following :—"This series of record performances, —in total production, in the machinery construction in the dockyards, in the completion and commissioning of warships of all classes—has been accompanied by very little difficulty with workmen." A condition of things which is no doubt due in considerable measure, as the *Record* says, to the fact that the present Director of Dockyards has had long experience in private yards. The Government Dockyards were never more efficient as shipbuilding establishments than they are now. The credit for this belongs to the Controller's Department at the Admiralty, to the Admiral Superintendents and other officials in the yards, as well as to the workmen.

Our Naval resources.

In spite of all that has been accomplished the shipbuilding resources of the country have not been unduly taxed. A reference to Captain Robinson's valuable paper in the *Naval Annual* of 1894 will show that the private yards are equal to a very much larger output of warships than has been demanded of them in the past year. No anxiety need be felt as to the power of the country to supply all the *matériel* for a naval war of which it may stand in need.

But if we turn from the *matériel* to the *personnel* it must be confessed that in spite of the large additions to numbers in recent years the outlook is serious. A considerable proportion of our small Naval Reserve would be required to man ships built and building, and there

is no margin to meet the wastage of war. To retain in peace time in the ranks of the Navy the numbers required for the emergency of war is from many points of view a gross waste of the national resources. Our efforts should rather be directed to create in our mercantile marine, which is too largely manned by foreigners, and in our fishing population, a reserve adequate in numbers, and made efficient by a period of training in the Navy.

We must now review in detail the progress of construction in 1895. The completion of the first-class battleships Majestic and Magnificent has already been alluded to. They have been described in previous numbers of the *Naval Annual*, but the following observations on the completion of the Majestic may be quoted from the *Engineer*:— Majestic and Magnificent.

"The length of the Majestic between perpendiculars is only 390 ft., but, including the massive ram bow, which projects to a distance of 15 ft., and the hang-over of the stern and gallery, the total length over all is about 430 ft. The beam is similar to that of the Royal Sovereign class—75 ft. Hence the increased length has improved the speed of the new vessels, 17·8 knots per hour having been obtained with the Majestic, although the I.H.P. is actually 1000 less than in the battleships of the 1889 programme. The displacement is 14,900 tons, exceeding that of any battleship afloat, in our own or other navies.

"The Majestic has a very imposing appearance afloat. The solidity of the upper battery, and the great height of the breastworks of the superstructure forward and aft, give the idea of a good deal of top hamper. As a matter of fact, however, the top hamper is quite as great in the Royal Sovereign, whilst the upper deck 6-in. Q.-F. of the latter are only protected by ordinary shields. In the new ships there are closed-in casemates at each corner of the battery, and even double plating above. The rise of the forecastle, which gives an extreme freeboard forward of about 23 ft., also adds to the sea-going appearance of the craft; and, during the thirty hours' run with the Majestic, the value of this feature was most apparent, as, though she ploughed up tons of water at the bows, the surf did not come within yards of her deck. The setting back of the bridges and chart-houses, away from the influence of the 'blast' of the great guns, is a most important change. It will be seen by Plate 18,* that the conning-tower, especially forward, stands clear of the bridge, so as to give an uninterrupted view all round. The position of the bridges of many of our earlier war vessels, which carry a heavy main armament, would render them most unsafe for those standing upon them when the heavy guns are fired on the beam.

* *Cf.* also frontispiece.

"The main armament of the Majestic consists of four 12-in. wire guns of 46 tons, two in each barbette, the breech and body of the gun being protected with a steel hood, having an extreme thickness of 10-in. in front.* . . .

"The mountings for the 6-in. Q.-F. guns are of a modified pattern, and a decided improvement upon the design of those for vessels of the Royal Sovereign class. They are, as usual, in cradles, but the trunnions fit into a forging, the pivot of which passes down into a forged steel pedestal fixed to the deck. There are twelve of these guns, eight between decks in casemates, and four in the upper deck battery before alluded to, also casemated.

"The 12-prs., sixteen in number, are only protected by a very small shield, which passes round the body of the gun, and does not afford the slightest protection to the crew working the weapon. Shelter for everything has been contrived, except that necessary for the men. Elaborate armoured trunks for the ammunition, as it passes up to the level of the deck, have been thought of, but the men are only covered by the slight steel sheets of the battery walls. This we cannot but think is a great blot in the design of the ship. Better to have had fewer guns, if only the upper deck battery could have had walls sufficiently thick to keep out the projectiles of small quick-firers. As matters are at present, it would be swept from end to end, only the corner casemates might prevent a raking fire. The balance of these quick-firing 12-prs. is something most remarkable. In whatever position of training or elevation the gun is placed it remains stationary. Nothing can exceed the beauty of the working of the whole of their mountings.

"The accommodation in the Majestic is not, we think, equal, on the whole, to that of the Royal Sovereign class, though certain features have been most elaborately carried out. The space upon the main deck forward is very fine, as the upper or forecastle deck rises, and gives a great deal of head-room. The sick bays are beautifully planned, and the comfort of patients has been well considered. But the cabin accommodation is rather cramped, as was a necessary consequence of having eight between-deck casemates instead of four. This is, however, unavoidable.

"The masting of the Majestic is superb, but we should have preferred two fighting tops protected with stout steel plating to the existing four, which would afford absolutely no shelter to the crews occupying them. But the twelve 3-prs. contained in those tops would make an awful sweep of the upper decks of an enemy, so long as the gunners were able to hold out alive."

* See Part III., Ordnance.

The trials of both ships passed off satisfactorily.* In the Magnificent an experiment has been made with induced draught—a system by which the ordinary air of the open stokeholds is drawn through the furnaces by means of fans. The following are the results of the eight hours' natural draught trials :—

Trials of Majestic and Magnificent.

	Mean Draught.	Air Pressure.	Mean Revolutions.	Total I.H.P.	Speed by Log.
Majestic . .	25 ft.	—	100·5	10,418	16·9
Magnificent .	24 ft. 11½ in.	1·4 in.	96	10,301	16·5

The results of the four hours' full power trials were :—

	Mean Draught.	Air Pressure.	Mean Revolutions.	Total I.H.P.	Speed by Log.
Majestic . .	—	—	106	12,097	17·9
Magnificent .	24 ft. 8½ in.	·9 in.	100·3	12,157	17·6

Both vessels subsequently completed their thirty hours' coal consumption trial without hitch. In the Majestic the coal consumption averaged 1·84 lbs. per I.H.P. per hour with 6075 I.H.P., 135 lbs. of steam, and 85 revolutions. In the Magnificent the consumption was 1·67 lbs. per I.H.P. per hour with 6086 I.H.P., 133 lbs. of steam, and 83 revolutions.

Gunnery Trials.

The following summary of the advantages secured by the new system of mounting the heavy guns is taken from the *Journal of the United Service Institution* :—"Every operation can be performed by hand, should the hydraulic gear—which is, however, completely duplicated—break down. The guns can be loaded simultaneously at a fixed position, or separately at an all-round position, and the time necessary for working the guns has been much reduced. . . . In the case of loading from a fixed position, the interval of firing rounds was 1 minute 19 seconds, and in the case of loading from the all-round position it was 1 minute 21 seconds. This was much better than guaranteed by Elswick, and it was evident that drill would bring about a still greater improvement. In the case of the guns of the Royal Sovereign class, the interval of firing rounds was 120 seconds. . . . Six rounds with full charges were fired from one of the 6-in. guns with the view of testing rapidity of fire from the pedestal mountings. The shooting was wonderfully good. The first three rounds were discharged in 27 seconds, and the second three in 23 seconds. There was also some firing against time from one of the 12-pr. guns, six rounds being fired in 23, and another six rounds in 24 seconds."

Sloops completed.

Four sloops have been completed during the year. The Torch and

* *Cf.* p. 117.

Alert, of 960 tons displacement, were built at Sheerness, the Algerine and Phœnix, of 1050 tons displacement, were built at Devonport. The two former have a maximum speed of 13¼ knots, the two latter of 13 knots. The four together have cost over £240,000, and represent no addition to the fighting strength of the Navy. Their trials passed off satisfactorily.

Destroyers.

Of the 42 torpedo-boat destroyers included in the Navy Estimates of 1894–95, eighteen were completed before March, 1895, nineteen others will have been completed by the end of the current financial year. In the following table are given the type of boilers fitted in various boats, and the particulars of some of the official trials not already published in the *Naval Annual*, which have taken place during the past twelve months. The Boxer was tried last year, but as she holds the record the particulars of her trials are given for comparison.

Name.	Builders.	Length.	Boilers.	I.H.P.	Speed.
Boxer	Thorneycroft	201·5	Thorneycroft	4487	29·17
Bruiser	Thorneycroft	201·5	Thorneycroft	—	27·97
Conflict	White	205·5	White	—	—
Dragon	Laird	210	Normand	—	27·12
Handy	Fairfield	194	Thorneycroft	3964	27·04
Hardy	Doxford	196	Thorneycroft	4126	27·07
Hart	Fairfield	194	Thorneycroft	4452	27·06
Haughty	Doxford	196	Yarrow	—	27·40
Hunter	Fairfield	194	Thorneycroft	—	—
Janus	Palmer	200	Reed	—	27·8
Lightning	Palmer	200	Reed	—	27·94
Opossum	Hawthorn	200	Yarrow	3895	27·13
Porcupine	Palmer	200	Reed	3859	27·91
Ranger	Hawthorn	200	Yarrow	3900*	27·8*
Snapper	Earle	200	Yarrow	3700	27·9
Starfish	Barrow	190	Blechynden	4492	27·97
Sturgeon	Barrow	190	Blechynden	3629	27·16
Sunfish	Hawthorn	200	Yarrow	4120	27·62
Teaser	White	205·5	White	—	—
Wizard	White	205·5	White	—	—
Zebra	Thames Ironworks	200	White	—	—

* Observation trial off the Tyne.

As was only to be expected with vessels of a new and remarkable type, accidents to the destroyers have been fairly numerous. These have been generally due to priming caused by irregular working and dirty water in the boilers. The copper tubes of the boilers of the earlier destroyers have had to be replaced with steel tubes. Some of the six boats which have locomotive boilers have given trouble owing to the inexact staying of the furnaces.

On the whole, it may be said that the torpedo-boat destroyer type has well come up to expectation, and has proved a very valuable addition to the navy. The speed attained on trial has exceeded the

estimate. They have proved themselves to possess fair sea-keeping qualities. The Ardent has been in commission for some sixteen months in the Mediterranean. Experience has shown that, though life on board is hardly comfortable, it is endurable, and only one man has been invalided home, in spite of the extremes of heat and cold to which her crew has been subjected. She has proved herself an excellent sea-boat, and in moderate weather could go anywhere. In rough weather, and steaming against a head sea, she is naturally very wet, and it would be very difficult to prevent water finding its way below if hard driven. The Ardent is reported to steer very well with the Thorneycroft rudders both ahead and astern. Six destroyers have been recently attached to the Channel Squadron and four to the Special Service Squadron, while three squadrons of four destroyers each have been put in commission at Sheerness, Portsmouth, and Devonport.

It is worth mentioning that the destroyers can, in good weather travel about—

50	miles per	ton of coal at	10 knots.
34	„	„	„ 13 „
21	„	„	„ 16 „
12	„	„	„ 20 „
10	„	„	„ 21 „
5 to 6	„	„	„ full speed—

including coal for all purposes. The coal capacity is generally from 60 to 80 tons, though it is as much as 110 tons in the case of the Contest.

We now turn to the progress of ships still under construction.

The Renown, which was laid down at Pembroke in February, 1893, was not launched till May, 1895. She has steamed round from Pembroke to Devonport, and may be expected to be completed in the course of the summer, having thus taken three-and-a-half years to build. She is of 12,350 tons displacement, has a speed of 18 knots, and is armed with four 29-ton guns, ten 6-in. Q.-F. guns, all in casemates, and eight 12-prs. She is protected on the same principle as the Majestic class. **Ships launched. Renown.**

Four of the remaining seven ships of the Majestic class have been launched. The Victorious, which was laid down at Chatham on May 28th, 1894, was launched on October 19th, 1895. The protecting shields of the principal armament will have mushroomed tops, instead of flat tops as in the Majestic, the fronts consisting of 10-in., the sides of 6-in., the backs of 4-in., and the roofs and floors of 2-in. plates. The Prince George, which was laid down at Portsmouth September 10th, 1894, was launched in August, 1895. Both ships are being rapidly **Majestic class.**

advanced, and could be completed before the end of the current year. The Mars, which was laid down at Messrs. Laird's at Birkenhead June 2nd, 1894, was launched on March 31st, 1896. The Jupiter, which was laid down at Messrs. Thomson's yard at Glasgow April 26th, 1894, was launched on December 18th, 1895. Of the other ships of this class, the Hannibal was laid down at Pembroke May 1st, 1894, and should be launched in April, 1896. The Cæsar, at Portsmouth, and the Illustrious, at Chatham, were laid down in 1895. Both will probably be launched in the course of the summer.

First-class cruisers.

The first-class cruisers Powerful and Terrible, of 14,200 tons displacement, were launched in 1895, the former at Barrow on May 28th, the latter at Messrs. Thomson's yard on May 27th. Some description of these large cruisers has been given in previous years. They are 500 ft. long between perpendiculars, or 538 ft. over all. The beam is 71 ft., and the designed draught 27 ft. Though there is absolutely no side armour, a very considerable proportion of the displacement is devoted to protection. The vitals of the ship are protected by an armoured deck of 4-in. maximum thickness on the slopes; the conning-tower barbettes and casemates are of 6-in. armour. The distribution of the armament can be best seen by an inspection of Plate 19, kindly furnished by the Admiralty. It includes two 9·2 guns, twelve 6-in., sixteen 12-pr., and twelve 3-pr. Q.-F. guns. The 9·2 guns are mounted on the forecastle and poop in barbettes, the gun itself being protected by a hood. Eight of the 6-in. guns are mounted on the main deck and four on the upper deck. "The sides of the ship," says a writer in the *Naval and Military Record*, "have been recessed so that the forward guns may be pointed well ahead and the aft guns well astern. The armour for these casemates is in two parts, the divisions being vertical in plane with the axis of the gun. Each of the two plates is about 13 ft. long and 7 ft. to 8 ft. high, the height varying with the position of the ship. The plates are, however, not only bent to a considerable curve, but the part which would formerly have been cut out to form the gun-port has not been entirely removed, but has been bent inwards, thus forming very efficient protection to the guns' crews. The broadside casemates, of which there are four in all, form shallow sponsons standing out from the ship's side, thus increasing the range of fire, which amounts to 60°. The four remaining 6-in. guns are mounted in casemates placed immediately above the fore and aft casemates on the main deck. All these casemates have 2-in. armour at the back to protect the crews from splinters of shell or *débris*. The ammunition is brought up through armoured trunks, the trunk for the upper deck guns being brought up through the back of the

H.M.S. "POWERFUL."

main deck casemates. Dismounting-rails are fixed to the deck, and by the aid of these the guns can be slung and traversed back so that they may be housed well inboard outside the casemates."

Four 12-prs. are mounted on each broadside on the upper deck between the casemates of the 6-in. guns, as in the Renown and the Majestic class. The sides of the upper deck battery are carried up so as to completely conceal, if not protect, the gunners from the enemy's fire—another feature which these cruisers and the Majestic class have in common.

"Great pains have been taken by skilful disposition of material to get extreme lightness combined with the great strength and rigidity required in a vessel of this nature. The armoured deck is, of course, a great feature of strength, and affords an excellent foundation to work from. Under the machinery space there is the usual double bottom, which extends from edge to edge of the armoured deck. Above this the ordinary frames are spaced 2 ft., but every sixth frame is a deep web frame stiffened by a reverse angle. These frames are 2 ft. 6 in. deep. This form of construction extends from the armoured deck to the upper deck.

"The armoured deck itself is composed principally of three thicknesses of steel plating, but at the edges, where it joins the side of the ship, two of the skins of plating are discontinued, so that the extreme edges of the deck, for a width of a foot or two, are only one skin of plating. This feature, which, presumably, is chiefly to facilitate and cheapen construction and save weight, has been very severely criticised in some quarters; but the objections raised are more apparent than real. With the ship at rest the edges of the deck are a long way below water-level, and it is only when the vessel is rolling that the supposed defects would be manifested. To bring the lower edge of the deck to the surface, however, would require a considerable roll. If the ship were rolling from the enemy the tendency would be to bring the edge of the deck more nearly parallel with the line of fire, when penetration would be far more difficult. If the ship were rolling toward the enemy the high crown of the very much arched deck would have to be surmounted. In these considerations the trajectory of the shot is supposed to be flat; with a plunging fire the danger would be increased, but that applies to deck protection generally.

"The machinery space occupies about half the length of the ship—240 ft.—and this, of course, in the middle part of the vessel. Such is the price paid for high speed. The coal capacity of these vessels is very large, the maximum amount carried being 3000 tons. A good deal of this coal is utilised as protection against the destructive

effects of shell fire. Steel panels are largely used in place of wood for cabin partitions, &c., and sheet-steel is largely used in all places possible.

"The engines of the Powerful, which consist of two pairs of three-stage compound engines, designed by Mr. A. Blechynden, have cylinders 45-in. high pressure, 70-in. intermediate, and two low-pressure cylinders each of 76-in., the stroke 48-in. These incorporate the modern features of steel in place of iron and large bearing surfaces. The boilers are, as in the Terrible, of the Belleville type, and forty-eight in number, in eight watertight compartments. There are 144 steam cylinders in the main and auxiliary engines, the former, however, contributing but eight of these. The boiler pressure will be 260 lbs. to the square inch, with reducing valves to bring it down to 210 lbs. in the cylinders. The total indicated horse-power will be 25,000 at 110 revolutions. The legend speed is 22 knots."

Second-class cruisers.

The nine second-class cruisers, of which the Eclipse is the prototype, have been launched. The following table shows the advance that has been made in second-class cruisers during the last ten years :—

	Apollo.	Astræa.	Eclipse.
Displacement	3400	4360	5600
I.H.P.	9000	9000	9600
Speed	19·75	19·5	19·5
Length	300 ft.	320 ft.	350 ft.
Beam	43 ft.	49 ft. 6 in.	53 ft.
Draught	16 ft. 6 in.	19 ft.	20 ft. 6 in.
Armament . . Q.-F.	2 6-in. 6 4·7 in. 8 6-pr.	2 6-in. 8 4·7-in. 8 6-pr.	5 6-in. 6 4·7-in. 8 12-pr.
Deck	2″–1″	2″–1″	3″–1½″
Coal supply	400	400	550
Average cost	£175,000	£238,000	£261,000

Ten of the twenty-one cruisers of the Apollo class are copper-sheathed, and in consequence displace 3600 tons as compared with 3400 tons, and cost on the average £188,000 as compared with £175,000. All the later second-class cruisers are copper-sheathed. It will be observed that for the extra two thousand tons of displacement in the new second-class cruisers we obtain a more powerful armament, rather stronger deck protection, and a better coal supply. The Eclipse class are indeed credited with being able to carry 1000 tons of coal at a pinch. On the other hand, they draw considerably more water, and their speed is the same or slightly less than that of previous cruisers, and it is in this respect that they are somewhat disappointing.

The Eclipse was launched at Portsmouth seven months after her

first keel plate was laid; but for nearly a year practically no work was done on her. The Minerva, which was laid down at Chatham in December, 1893, and the Talbot, which was laid down at Devonport in March, 1894, were launched, the former on the 23rd September, and the latter on April 25th, 1895. The periods during which these three dockyard-built cruisers have been under construction (amounting to three years in the case of the Eclipse), justify the remarks made in previous numbers of the *Annual*, that the rate of construction attained in the case of the Royal Sovereign, the Majestic, or the Magnificent, cannot be accepted as normal. These three cruisers will be ready for sea in the course of the summer. The other six cruisers of the Eclipse class are building by contract. The Diana was launched on December 5th, the Juno on November 16th, 1895, the Doris on March 3rd, and the Dido on March 21st, 1896.

Ships laid down.

Diadem class.

The most important ships laid down during the past year are four first-class cruisers of a new type.* The Andromeda is to be built at Pembroke dockyard, and will be engined by Messrs. Hawthorn, Leslie and Co. The other three will be built by contract—the Niobe at Barrow, the Europa at Messrs. Thomson's yard, Clydebank, the Diadem at the Fairfield Yard. The contractors will also supply the machinery of these vessels. The following description is taken from the *Engineer* :—

"The length between perpendiculars will be 435 ft., over all—from ram end to taffrail—462 ft. 6 in.; breadth extreme over sheathing 69 ft., and moulded depth 39 ft. 9 in. The load draught is designed to be 25 ft. 3 in., at which the displacement is 11,000 tons. The shell of the vessel up to above the load water-line has an outside sheathing of teak 4 in. thick, to take the final sheathing of sheet copper, and large rolling chocks or keels are fitted on each bilge.

"The engines and boilers will be protected by an armour deck of steel plates 4 in. in combined thickness, running fore and aft, and arching from 6 ft. below the water-line at the sides, to 3 ft. 6 in. above it at the centre line of the ship. In the way of engines, &c., this deck is further raised so as to cover the cylinder tops. The propelling engines of the vessel consist of two complete independent sets of four-crank triple-expansion inverted-cylinder type; the diameter of the high-pressure cylinder is 34 in., of the intermediate pressure 55½ in., and of the two low-pressure cylinders 64 in. each, all with a piston stroke of 48 in. Steam for the engines will be supplied by thirty Belleville water-tube boilers, with a total heating surface of 45,900 square feet, and a fire-grate area of 1450 square feet. They will work under natural draught, or with an air pressure in the

* *Cf.* plate in Part II.

stokeholds of only ½ in. at its maximum, as it will be merely required for ventilating purposes. The propelling machinery will be capable of developing 16,500 I.H.P., which it is estimated will be sufficient to drive them when fully loaded at a speed of 20½ knots an hour."

The armament of each cruiser will consist of sixteen 6-in. and seventeen smaller quick-firing guns and three torpedo-tubes. Twelve of the 6-in. guns will be mounted in casemates on the side, two will be carried in the forecastle, and two in the poop behind shields. Two of the torpedo-tubes will be on the broadsides forward, submerged, and the third one will be right aft amidships, above the water-line.

Second-class cruisers.

Four second-class cruisers of a modified Eclipse type have also been commenced. The Arrogant and Furious were laid down at Devonport on June 10, 1895, the Gladiator at Portsmouth, and the Vindictive at Chatham, on January 27th, 1896. The dimensions will be: Length, 320 ft.; beam, 57 ft. 6 in.; mean draught, 21 ft.; with a displacement of 5800 tons. The armament will consist of Q.-F. guns, viz., five 6-in., six 4·7-in., eight 12-prs. (12 cwt.), one 12-pr. (8 cwt.), three 3-prs. Hotchkiss, and five Maxim machine guns. They will also be fitted with an 18-in. submerged tube on each side. The cost of the guns alone will be about £16,500. The engines are to be of the inverted-vertical triple-expansion type of 10,000 I.H.P., with natural draught. The speed is estimated at 18½ to 19 knots. The coal capacity is 500 tons. Considering the large displacement now reached by our second-class cruisers, their offensive powers and speed are hardly satisfactory. They compare very unfavourably in these respects with the Elswick cruiser Buenos Aires, though they doubtless possess elements of superiority in strength of construction, &c., which are not so apparent.

Third-class cruisers.

Two third-class cruisers of a new type have been laid down, and others are projected. They are of 2135 tons displacement, 7000 H.P., and 20-knot speed. The Pelorus was commenced at Sheerness on May 21st, 1895, and launched on February 15th, 1896. The Proserpine has been laid down on the slip vacated by the Pelorus. The hull of the vessel is constructed of steel, and is protected by a 2-in. turtle-back deck. The machinery is to be supplied by Messrs. Thomson. "Of the coal to be carried, which will be sufficient to give the vessel a radius of action, at ten knots, of about 7000 miles, part is to be stowed above the protective deck and over the engine and boiler rooms, while the remainder will be in side bunkers below that deck. The armament of the Pelorus will consist entirely of Q.-F. guns, of which there will be eight 4-in., eight 3-prs., and three Maxim guns, two of the 4-in. guns being mounted on either side of the conning-tower on the forecastle and two on the poop, the remaining guns being distri-

buted on the upper deck and at the bow and stern. The vessel is also fitted with two torpedo-tubes. The ship has two wooden masts."—*Times.*

Torpedo-boat destroyers.

In view of the splendid results attained by M. Normand with the latest torpedo-boats that this eminent Havre shipbuilder has built for the French Navy, which reached thirty-one knots in the case of the Forban, and by Messrs. Yarrow with the Russian Sokol, it was evident that a speed of twenty-seven knots could no longer be accepted as sufficient for the destroyers to be built for the British Navy. The new destroyers are to have a speed of thirty knots. The following description is from the *Times*:—"The Desperate, the first of six of the new class of torpedo-boat destroyers ordered from Messrs. Thorneycroft and Co., was successfully launched from their yard at Chiswick on February 15th. The new destroyer is in general design similar to the Daring, built by the same firm, but, having to attain the speed of thirty knots, she is larger and is provided with greater engine power. Her length is 210 ft.; beam, 19 ft. 6 in.; and depth, 13 ft. 6 in. To keep down the weight of the hull a new special make of steel has been used in it, which has a greater tensile strength of some ten tons to the square inch than the mild steel generally used. The propelling machinery of the new vessel is of the Daring type and arrangement, but is designed to indicate 5400 I.H.P., or 1000 more than that of the Daring. The boilers are of the Thorneycroft water-tube type, three in number, the two forward ones being placed back to back with one funnel in common, and the after one with a funnel to itself. An improvement has been made by utilising the space between the funnels and their casings as upcast shafts for the purpose of ventilation. A modification has been made in the bow and stern of the Desperate consequent on the high speed she is intended to attain, the bow having more flare and the stern being made to rake forward, instead of aft, above water, thereby rendering her a much drier vessel than would otherwise be the case. The armament is to be six Q.-F. guns—four on the broadsides, one forward, and one aft—and two torpedo tubes. The Desperate was launched with all her machinery, boilers, &c., on board, and is practically ready for steaming, so that she should soon make her trials."

Messrs. Laird, of Birkenhead, have secured the contract for ten of these 30-knot destroyers, viz., the Earnest, Griffon, Locust, Panther, Quail, Seal, Sparrowhawk, Thrasher, Virago, and Wolf; four of which will very shortly be ready for their trials. Messrs. Thomson, of Clydebank, have four in hand, viz., the Brazen, Electra, Recruit, and Vulture. Their dimensions are: length, 210 ft.; beam, 20 ft.; mean draught, 5 ft. 3 in.; estimated displacement, 300 tons. They have

two propellers, and the estimated speed is 30 knots. The armament consists of one 12-pr., five 6-prs., and two torpedo-tubes. The coal capacity is 80 tons, and the complement 58 men. The Naval Construction and Armaments Co., of Barrow, have two in hand, the Avon and Bittern, which will be fitted with Thorneycroft boilers.

Refits. Monarch. The refit of the Monarch has been completed at a cost of £136,000.* The refit of the Sultan will cost upwards of £200,000. It is open to question whether it was worth while to spend such large sums as have been spent on the Monarch and Sultan, while they retained their old muzzle-loading armaments. Sultan. The Sultan, since she was recovered from the bottom of the Comino channel, has been in dockyard hands at Portsmouth. The refit has at last been completed. She has been furnished with new engines and boilers, and her steam trials have been most satisfactory. On the eight hours' run under natural draught, she attained a mean speed of 14·6 knots with 6531 I.H.P. and 88·7 revolutions. On the thirty hours' coal consumption trials, her average speed was 13·8 knots for a coal consumption of 1·79 lbs. per I.H.P. per hour. She is now fitted with two masts with military tops.

Blake. The Blake, on her return from her three years' commission on the North American station, has had considerable alterations carried out in the combustion chambers of her furnaces, and new steel tubes have been fitted to her boilers. The designed speed was 22 knots, but on her first trials she only attained a speed of 19·12 knots with 14,450 I.H.P. On her recent four hours' full power trial, she attained a speed of 21·5 knots with 19,579 I.H.P.

The Dreadnought has been reboilered, and from £25,000 to £30,000 is being spent on each of the third-class cruisers Cordelia, Comus, and Conquest. Several other ships have been refitted.

Admiralty contracts. The prominence given to the subject of Admiralty contracts in the newspapers during the past twelve months, the complaints which have appeared in the *Engineer*, *Engineering*, and other papers as to the treatment which contractors for Government work have received at the hands of the Admiralty, demand some notice in the pages of the *Naval Annual*. There is the old complaint that contractors have lost over ships built for the Navy, owing to the delays in supplying drawings, alterations in details, and vexatious interference of the Admiralty inspectors during the period of construction. On this it may be said that though it is quite possible that the methods of the Admiralty in these respects are capable of improvement, contractors are themselves in some measure to blame if they send in tenders at prices which do not make allowance for Admiralty restrictions. It may pay contractors in certain cases to undertake Government work at

* The Monarch attained the remarkable speed of 15¾ knots in her trials.

unremunerative prices. The complaint, that in recent distributions of Admiralty orders for shipbuilding, no ship has been allotted to the Thames, has been put forward with remarkable energy by the head of the Thames Ironworks, and has been supported by all the political influence which members of Parliament whose constituencies are situated in the neighbourhood of these works could bring to bear. It is many years since the shipbuilding industry, at any rate as far as merchant ships are concerned, migrated from the Thames to other parts of England from causes into which it would be out of place to enter here. It is possibly true that the high rate of wages now prevailing in the Thames district may prevent the Thames Ironworks from tendering at the same prices as shipbuilding firms in other localities. It must, however, be borne in mind that the rate of wages in the Thames is probably governed by the fact that the great bulk of the work performed by the various classes of workmen in the shipbuilding trade is repair work or "old work," which is universally paid for at higher rate than new work.* There is every reason from a national point of view for a wide distribution of Admiralty contracts to different localities, but there is no justification for the Admiralty building ships in a locality in which it does not pay private shipowners to build. Into the complaint of Messrs. Yarrow, that the Admiralty distributed their working drawings to a large number of firms who were for the first time engaged in this class of work, we do not feel competent to enter. A defence of the action of the Admiralty in this matter was published in the *Times* of February 29. It may also be pointed out that Messrs. Laird, who have the contract for ten of the twenty new 30-knot boats, sent in their designs for the original destroyers at the same time as Messrs. Yarrow, that these were based on experience obtained with the Rattlesnake—in her way the most successful of the torpedo gunboats—and that the boats built from these designs differ materially in the arrangement of hull and machinery from Messrs. Yarrow's boats. It may be said, in conclusion, that it is clearly the duty of the Admiralty officials concerned to get the best terms they can for the British taxpayer; but it is equally their duty, from a national point of view, to encourage the shipbuilding resources of the country, and more especially those firms, such as Messrs. Yarrow and Thorneycroft, who have effected, by means of costly experiments, great improvements in a particular class of warship.

Personnel.

The difficulties arising from the dearth of lieutenants became so accentuated during the past year, that the Admiralty admitted one hundred officers of the Mercantile Marine direct on to the lieutenants'

* See table of rates of wages in Part IV.

list of the Royal Navy. The problem of the supply of officers has since been thoroughly grappled with. An increase in the authorised numbers in each rank in the executive list below that of flag officer has been sanctioned, but it will be some years before these numbers are attained. The number of executive officers in the Naval Reserve is to be raised to 1300 this year, and ultimately to 1500. It should be noted that it has been decided to raise the age of entry of naval cadets and to substitute a college on shore for the Britannia. There was an increase of over 5000 in the total numbers voted for the Navy in 1895–6 as compared with the previous year. A further increase of nearly 5000 is proposed for the coming year. The numbers available for sea service in 1895–6 were 81,508, in 1896–7 they will be 85,818. The various questions relating to the *personnel* of the Navy are dealt with in a later chapter. The numbers of men at present available are quite inadequate to meet the requirements of war. A large addition to the Naval Reserve is imperatively necessary.

New programme.

The Navy Estimates for 1896–7 amount to £21,823,000, as compared with £18,701,000 for 1895–6, the principal items of increase being £1,970,000 under the head of contract shipbuilding, and £850,000 under the head of armaments. Five battleships—improved Renowns of 12,900 tons displacement—four first-class, three second-class, and six third-class cruisers, and twenty torpedo-boat destroyers of 30-knots' speed will be laid down. Most of the latter have already been commenced.

Naval works.

Apart from that provided for in the Navy Estimates, a very large expenditure was proposed under the Naval Works Act of 1895 on the construction of breakwaters and docks, and on the improvement of naval ports. A large additional expenditure under this head is proposed for 1896–7, the details of which are given in the Bill laid before Parliament. The total expenditure now proposed is £14,040,000.* The most noteworthy feature in these proposals is the decision of the Admiralty to lengthen the dock now in course of construction, and to build two additional docks at Gibraltar. Gibraltar is at the present moment the most important strategic point in the British Empire, and it is exceedingly desirable that it should be made a valuable base for our Fleets, though the difficulty of finding space not only for the docks, but for the workshops and for accommodation for the workmen are enormous. Special attention may be directed to the expenditure of over £1,000,000 on naval barracks necessitated by the increase in the permanent force of the Navy.

T. A. Brassey.

* The items are given in Part IV.

CHAPTER II.

The Progress of Foreign Navies.

The most interesting and important naval display of the year took place in Kiel Bay, on the occasion of the opening of the Baltic and North Sea Canal. Nearly all the powers were represented by squadrons or divisions, comprising the most recent examples of naval architecture. It was thus possible to make useful comparisons between the various types of warships assembled. England, Germany, and Italy sent squadrons; Russia, France, the United States, Spain, and Austria, naval divisions; the second-rate navies of the North of Europe, less important groups of ships. Even Turkey was represented by an imperial yacht. The fêtes at Kiel therefore afforded an excellent practical lesson, from which many sought to profit. It is difficult to form an opinion of a ship-of-war from her external appearance or by a superficial inspection of her internal arrangements. To properly estimate her powers, a complete knowledge of her various parts, as well as of the training and discipline of her crew, is requisite. Still, even a brief visit is capable of giving a much more vivid idea of a ship-of-war than any written description could afford. For this reason, therefore, many of the most famous constructors and best known naval writers were present at Kiel, where they found exceptional opportunities of studying their subject. The system of protection of battleships and cruisers chiefly attracted their attention.

At the present moment, warship-construction is undergoing a process of evolution; for not only is it sought to give to the battleship proper protection for its top sides and its guns against explosive shells, but a very marked tendency is also displayed at the various Admiralties to build armoured cruisers of large displacement, in which the vitals and the portion above the water-line are covered with armour of medium thickness, consisting of steel plates, hardened by the Harvey process. But, in order to combine high speed, coal endurance, and adequate protection for the hull, it is necessary to accept the condition of large tonnage, and consequent high cost. It would seem that at the present moment the choice lies between

the battleship of 17 to 18 knots, and the armoured cruiser of 20 to 23 knots. The advocates of either type can bring forward strong arguments in favour of their respective views.

The question of boilers has made considerable progress. Most of the naval powers have adopted the system of water-tube boilers, following, in this respect, the example set by the French manufacturers. After an exhaustive enquiry, the English Admiralty has experimented with the best known types, and has decided to place water-tube boilers on board the cruisers recently laid down. The Russian Navy has also made use of boilers of this kind in several vessels, and Italy, Germany, and the United States have followed in the same path.

In the matter of ordnance, the employment by England of steel-wire guns may be mentioned; but it does not appear that the other powers intend to imitate this example, or to abandon the ordinary process of construction. The armament of the new vessel includes guns of high initial velocity, the tendency being to work both the guns and the turrets themselves by hand and by means of electricity.

Torpedoes fired from a submarine tube are generally in favour, thus following the course adopted by the British authorities. Attention has been directed to the possibly destructive effect of the accidental discharge of torpedoes on board ship, in consequence of being struck by an opponent's projectile. It is universally admitted that such a contingency must be guarded against. The question therefore arises whether it is better, on board the large ships, to protect the torpedoes in armoured casemates above the water-line, or to stow them below the armoured decks.

The use of wood is constantly diminishing in ships-of-war, fire-proof material being substituted as far as possible. Great progress has been made in the matter of speed, in the case of both torpedo-destroyers and torpedo-boats. M. Normand holds the record with the *Forban*, which has steamed over 31 knots, while the English torpedo-destroyers have attained nearly 30 knots.

A general survey of the programmes of construction shows that with the exception of Great Britain, where considerable efforts are being made, with a proportionate increase in the Estimates, most of the powers are not seeking to augment their naval expenditure. France has reduced the number of ships laid down; Germany and the United States have not added largely to their shipbuilding; but Russia is working systematically and steadily at the strengthening of her Navy, and her volunteer fleet has recently received considerable additions. Some of the smaller powers, in view of their financial

position, have abandoned the heavy burden entailed by naval ambition, while others are building ships abroad. There is, however, one maritime power which threatens to become formidable, and the progress of which cannot be too closely watched by western nations. We refer to Japan, whose Navy, even with the addition of the Chinese ships captured at Wei-hai-wai, still appears to be regarded as insufficient. Japan is about to build, or to order abroad, an entirely new fleet, the particulars of which will be found later on, and which will give her naval supremacy in the far east. The nations of Europe having interests in those distant waters, and desiring to remain able to defend those interests, must resign themselves to enormous sacrifices. Recent events have shown that from the contingencies of politics unforeseen conflicts may arise, in which the navies of the powers concerned would take a leading part. From these general considerations let us pass, as on previous occasions, to the progress of the respective foreign navies.

France.

The Estimates for 1896 amount to £10,637,096, of which about £9,600,000 is for purely naval purposes. The votes are less by some £200,000 than those granted under the 1895 Estimates.

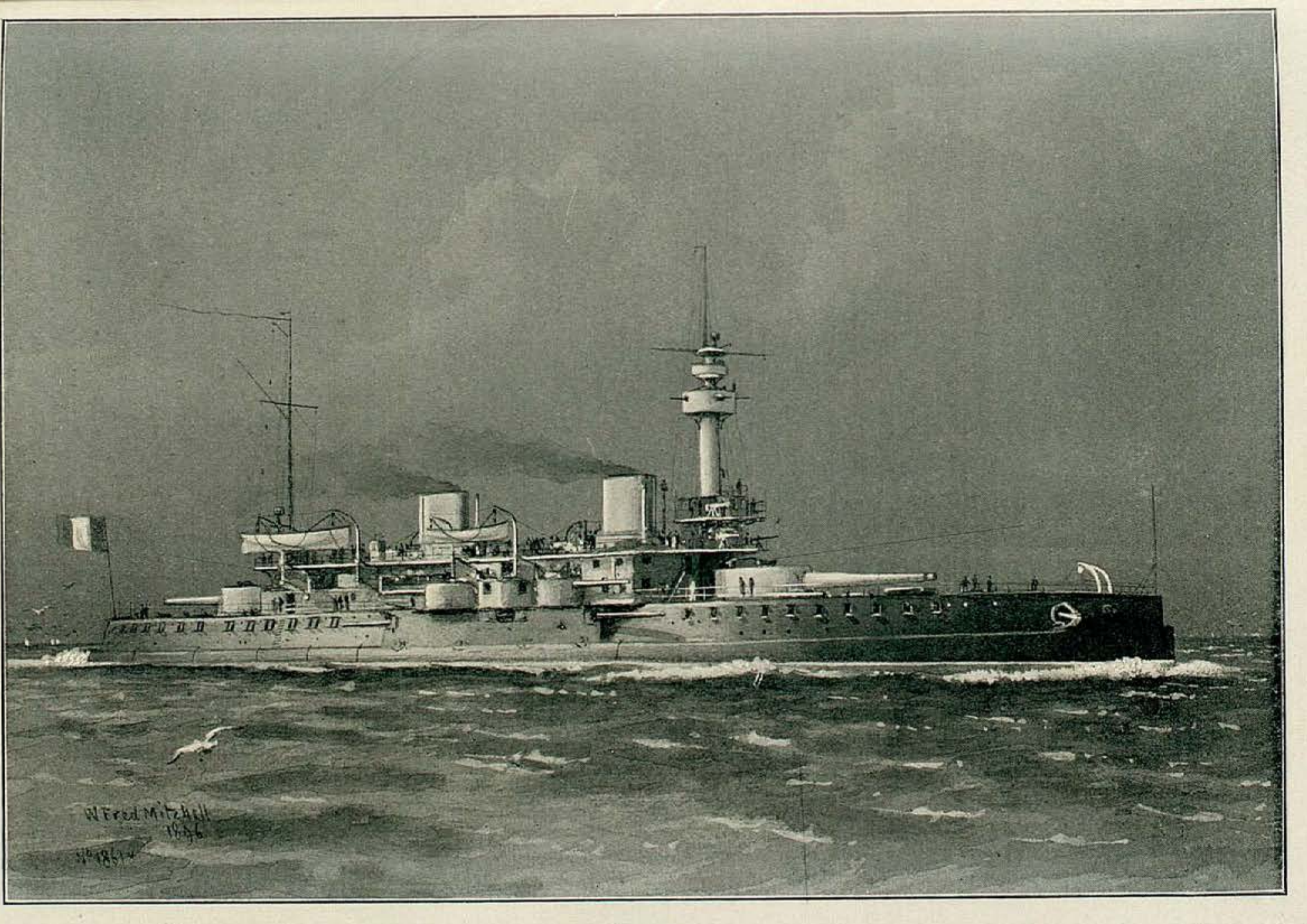
The programme of new construction for the current year has been recast several times. Finally, Parliament has decided to reduce the number of ships to be laid down, and, on the other hand, has increased the votes for the completion of ships in course of construction, the general result being that the round sums for the augmentation of the fleet have been reduced. The Budget Committee, in considering the Government programme, has only retained the ships intended to reinforce the European squadrons, and has systematically struck out all vessels which it was proposed to construct for the naval divisions and for foreign stations.

During the year there has been no warlike event to note, except the participation of the Navy in the Madagascar expedition, limited to transport services, and a few small operations on the part of the Betsiboka river flotilla and the Indian Ocean division.

An incident which might have had serious consequences took place in the roadstead at the Îles d'Hyères, on the evening of the 13th of November last. The Mediterranean Active Squadron, commanded by Vice-Admiral Gervais, was entering the above roadstead in single file by the *grande passe*. The course steered was nearly

west, passing a little to the north of Esterel Point, the eastern extremity of the peninsula of Giens. The Admiral's intention was that the ships of the squadron should anchor simultaneously in Badine Bay. To accomplish this it was necessary to make a turn of 90° to starboard. This was accordingly done, but, for some reason which is not clear, the flagship Formidable answered her helm badly, described too wide a circle, and grounded on a shoal of 4·37 fathoms, which had formed since the last hydrographic survey, according to which there should have existed a depth of 6½ fathoms at this point. The Marceau, which followed the Formidable, answered her helm quickly, and anchored without running aground or colliding with her next ahead. The Amiral Baudin (No. 3) ran aground almost at the same time as the Formidable. The Courbet (No. 4) was able to avoid the Amiral Baudin, and touched the ground slightly. The other vessels of the line stopped in time. The Formidable got off during the night, with the assistance of the Marceau, the Courbet two days later, but the Amiral Baudin had to be lightened to the extent of 1200 tons, and was not floated until the 19th of November. None of the vessels sustained any damage. Admiral Gervais was summoned to appear before a Commission of Inquiry, who decided that the responsibility for this accident did not rest with the Commander-in-Chief of the Mediterranean Squadron.

Brennus. Last year we stated that one of the military masts had been removed from the Brennus, and that she had been relieved of a portion of the superstructures on the upper deck, erected for the reception of the boats when at sea. Another very important modification has been introduced in the hull. In the course of a trial of the forward turret, which is armed with two 34-cm. (13·4-in.) guns, the following fact was discovered. On the guns being trained on the broadside, the vessel heeled over slowly. This movement then suddenly increased and finally ceased, leaving the ship in equilibrium but in an inclined position. Steps were taken to bring her to an even keel, and it was then found upon examination that the heel, though due in the first instance to the guns, was increased owing to the form of the hull. At the upper edge of the armour-belt, at the water line, the side of the ship projected and took this shape. The vertical portion of the armour-belt was joined to the hull above by horizontal plating. Under these conditions, the inclination having been sufficient to submerge the whole of the belt, the ship only recovered herself when the projecting portion was again set free and the water line had been re-established on the vertical portion of her side. This was a defect which it was necessary to rectify. It was done by affixing metal plates connecting the exterior edge of the



"BRENNUS,"

FRENCH BATTLESHIP.

belt to the ship's side in a sloping direction, as shown by the dotted line. Thus a sort of sheathing was added to the Brennus. This work occupied several months, and on its completion the ship resumed her trials, which were interrupted several times by the heating of bearings. A trial was then made at high speed in bad weather, in the course of which the Brennus sustained damage of rather a curious character. In order to resist the blast of the big guns, a certain elasticity had been given to the upper deck, with apparently satisfactory results, for the guns were fired ahead, astern, and in all directions, without causing the least damage. Yet, on the occasion in question, while steaming at a speed of about 17 knots, the Brennus shipped several heavy seas, with the result that the upper deck subsided to the extent of several centimetres. Later on the trials were resumed, but were somewhat troublesome, owing to the bearings becoming heated whenever a speed of 16 knots was exceeded. The engines of the Brennus were constructed at the government works at Indret. At length the trials were successful, and the Brennus, exerting her full power, attained a speed of 17·12 knots. The engines indicated 14,060 horse-power with 92·4 revolutions, while the coal consumption was 2·178 lbs. per horse-power per hour.

Water-tube boilers.

In the course of the discussions which took place last year in the House of Commons on the subject of the adoption by the English Admiralty of water-tube boilers, one of the speakers stated that the system had been abandoned in the French Navy. The following list of ships, which includes practically all the battleships, cruisers, and torpedo-gunboats now building in France, will suffice to show the incorrectness of this assertion. The ships fitted with boilers of the d'Allest type include the battleships Charles Martel, Carnot, Jauréguiberry and Masséna, the commerce destroyers Guichen and Chateaurenault, the cruisers Cassard, Du Chayla, D'Assas, and the torpedo depôt ship Foudre. Those fitted with Belleville boilers include the battleships Bouvet, Charlemagne, St. Louis, and Gaulois, the armoured cruisers Bruix and Pothuau, the second-class cruisers Pascal, Bugeaud, Catinat, Descartes and Protet, the third-class cruisers Galilée and Lavoisier, and the torpedo gunboat Casabianca. The armoured cruiser Jeanne d'Arc and the torpedo-gunboats La Hire and Dunois will be provided with Normand boilers. These last three ships are designed to steam 23 knots.

To complete the list of those provided with water-tube boilers several ships in commission must be included, such as the battleship Brennus, the coast defence ships Bouvines, Tréhouart, Jemmapes and Valmy, the armoured cruisers Latouche-Tréville, Chanzy and Charner, and the second-class cruisers Alger, Chasseloup-Laubat, and Friant.

The following ships have been launched:—

Masséna. The battleship Masséna which is completing at St. Nazaire, at the Ateliers et Chantiers de la Loire, after the designs of M. de Bussy, was launched in July. The dimensions are:—length, 384 ft.; beam, 66 ft.; draught of water aft, 27 ft.; displacement, 11,924 tons. The Masséna has three screws, each worked by an independent vertical triple-expansion engine. Steam is generated in 24 water-tube boilers on the d'Allest system. The I.H.P. with natural draught is 9300, with forced draught 13,500, the corresponding speeds being 17 and 17½ knots. The coal capacity is only 630 tons, giving an endurance at 10 knots of 4000 miles, or 800 miles at maximum speed.

Protection is afforded by a Schneider steel belt at the water-line, from 10·8 in. to 17·7 in. thick. A 3·5-in. armoured deck extends from end to end, and a splinter-proof deck above this. The armament consists of two 12-in. guns mounted in turrets, one forward and one aft, amidships; 2 10·8-in. guns in barbettes on either side, 8 5·5-in. Q.-F. guns also in turrets on the broadsides, 8 3·9-in. Q.-F. guns on the superstructure, protected by shields of hardened steel, besides 12 47-mm. and 12 37-mm. Q.-F. guns. There are 6 torpedo-tubes, of which two are submerged. The fixed bases of the large turrets are covered with 15¾-in. and the revolving parts with 13¾-in. steel plates. The smaller turrets for the 5·5-in. guns are protected by 4-in. plates. It will be observed that in the Masséna the disposition of the principal guns is in the form of a lozenge, as in the case of the earlier French battleships. Each gun of smaller calibre is independent in its action, and is adequately protected against shell-fire and small quick-firing guns.

Charlemagne. The battleship Charlemagne, which was commenced at Brest on the 14th July, 1894, was launched fourteen months later and should be completed at the end of 1898. She is a sister ship of the St. Louis, now building at L'Orient. The dimensions and other features are as follows:—Length, 381 ft.; beam, 66 ft. 6 in.; depth of hold, 48 ft. 9 in.; maximum draught, 27 ft. 6 in.; displacement, 11,275 tons. The Charlemagne will have three screws, each worked by a vertical triple-expansion engine, the motive power of which is produced by 20 Belleville boilers. The I.H.P. with forced draught is 14,500, which is expected to give a speed of 18 knots. The coal capacity is 677 tons in the bunkers, which can be increased to at least 1000 tons. The endurance at 10 knots, with 677 tons, is 4500 miles, or at full speed 800 miles.

Protection is afforded by a steel armour belt extending from stem to stern, and 6 ft. 7 in. in depth, 4 ft. 11 in. being above the water-line. The maximum thickness amidships is 15¾ in., but this thickness is only

carried down to 8 in. below the water-line, from which point it decreases to 10 in. at the lower edge. Above this armour, to a height of 3 ft. is a cofferdam, covered with 3-in. hardened steel plates. The hull is further protected by two armoured decks: the first, 3½ in. in thickness, is on a level with the upper edge of the water-line armour-belt; the second is a splinter-proof deck of 1½ in. armour, level with the lower edge of the same belt. The intermediate space thus forms an enormous caisson, divided by bulkheads and filled with coal. The armament consists of 4 12-in. guns, 10 5·5-in., 8 3·9-in., 16 1·85-in., 10 1·46-in. Q.-F. guns and 8 1·46-in. revolver-guns. There will be 4 torpedo-tubes, probably submerged. The 12-in. guns are mounted in pairs in turrets, one forward and one aft, protected by 15¾-in. steel armour. Eight of the 5·5-in. guns are on the broadside, separated by strong bulkheads and protected by shields of 2·8 in. hardened steel. The two other guns of similar calibre are mounted on sponsons on the spar deck, where the 3·9-in. guns are also carried, the latter being unprotected. The smaller guns are distributed between the deck and the fighting-tops of the two military masts. By the above arrangement, two 12-in., six 5·5-in., and four 3·9-in. guns can be fired ahead and astern, while on the broadside four 12-in., five 5·5-in., and five 3·9-in. guns can be fired simultaneously. The larger guns and the turrets can be worked by hand or electricity.

The armoured cruiser Pothuau was launched at Havre by the Forges et Chantiers de la Mediterranée, having been laid down at the beginning of 1893. She is an enlarged Latouche-Tréville. Her length is 371 ft.; beam, 50 ft.; maximum draught, 21 ft.; displacement, 5320 tons. Two vertical engines of 6500 I.H.P. with natural, and 10,000 I.H.P. with forced draught, are estimated to give speeds of 18 and 19 knots. The boilers are of the Belleville pattern. The coal endurance at 10 knots is 4500 miles, or at full speed, 900 miles; the bunker capacity, 538 tons. Pothuau.

Protection is given by a belt of hardened steel encircling the water-line, 1·26 in. to 2·36 in. in thickness, and an armoured deck of 1·38 in. thick on the level and 3·35 in. on the inclined portion. The conning-tower is protected by 10-in. armour.

The armament comprises two 7·6-in. guns, ten 5.5-in., ten 1·85-in., and eight 1·46-in. Q.-F. guns, and four torpedo-tubes. The two largest guns are in closed turrets covered with 7-in. armour. They are worked by hand or by electricity, and are placed one forward and the other aft. The 5·5-in. guns are placed *en échelon*, in such a way as not to obstruct each other's range of fire, and are protected by steel shields. The smaller guns are mounted on the deck and bridges, in the tops, and elsewhere.

Foudre. The torpedo depôt ship, Foudre, launched at Bordeaux in October last, was suggested by the Vulcan. Length, 380 ft. 6 in.; beam, 51 ft. 3 in.; maximum draught, 23 ft. 5 in.; displacement, 6090 tons. Two screws are worked by two vertical triple-expansion engines, the water-tube boilers being of the d'Allest pattern. The horse-power is to be 11,500 with forced and 8000 with natural draught, the speed in the former case being 18·5 knots. Coal endurance at 10 knots, 6000 miles; bunker capacity, 840 tons.

The Foudre is protected by an armoured deck, and carries a light armament, consisting of eight 3·9-in., four 2·56-in., and four 1·46-in. Q.-F. guns. There are no torpedo-tubes, but eight torpedo-boats are carried on the deck in two groups, forward and abaft the funnels. The length of these boats is 59 ft. 10 in.; beam, 8 ft. 10 in.; draught, 4 ft. 9 in.; I.H.P. 2250; displacement, 14 tons; estimated speed, 18 knots. The original intention was that two of the torpedo-boats of the Foudre should be of steel, the six others of aluminium. The French shipbuilders objecting to undertake the aluminium boats, a specimen was ordered at the works of the Yarrow Company at Poplar. As we know, in this boat the contract speed was considerably exceeded, but soon after her delivery at Cherbourg, it was found that the hull perished rapidly and became unfit for service, in consequence of which the use of aluminium has been abandoned, and the remaining boats will be built of steel. They have been ordered at Creusôt.

A workshop has been fitted up on board the Foudre for the repair of machinery, and also a well-equipped store for the use of the torpedo-boats and the torpedo service of the squadron. This vessel, which was launched with her engines, boilers, and all her principal fittings on board, should be commissioned shortly; unless it is decided to convert her into an ordinary cruiser as has been recently reported. In this case her torpedo boats will be removed, and she will be fitted to carry additional guns.

Pascal. The cruiser Pascal, launched at Toulon in September, 1895, is a sister-ship of the Descartes, and, like that vessel, is intended for service on foreign stations. For this reason she is sheathed with wood and coppered. Her dimensions, &c., are as follows:—Length, 326 ft.; beam, 42 ft. 3 in.; maximum draught, 21 ft. 5 in.; displacement, 3988 tons. She is protected by an armoured deck of 1·38 in. on the level portion and 2 in. on the slope. The latter portion of the deck joins the side 3 ft. 11 in. below the water-line. A cellular partition, filled with coal, forms a cofferdam, joined to and above the armoured deck.

The armament consists of four 6·5-in., ten 3·9-in., eight 1·85-in., and four 1·46-in. guns, and two torpedo-tubes. All the guns are

Q.-F., and are so placed as to enable two 6·48-in. and six 3·9-in. to fire astern. The Pascal has two screws, worked by vertical triple-expansion engines, expected to develop 8500 horse-power. The boilers are of the Belleville type. Estimated speed, 19 knots. Normal coal capacity, 650 tons. Coal endurance at 10 knots, 5500 miles.

The second-class cruiser Du Chayla, launched at Cherbourg on the 18th November, was laid down on the 13th of March, 1894, and should be completed in February, 1897. Length, 325 ft. 6 in.; beam, 44 ft. 1 in.; extreme draught, 20 ft. 6 in.; displacement, 3952 tons. Two vertical triple-expansion engines, working two screws, should develop 6000 horse-power with natural, and 9500 horse-power with forced draught. The twenty d'Allest boilers will be distributed in three compartments. The estimated speed is 19¼ knots. Protection is provided by an armoured deck 1 in. thick amidships, and 3 in. thick on the sloping sides. The armament will be six 6·3-in., four 3·9-in., ten 1·85-in., eleven 1·46-in. Q.-F. guns, and two torpedo-tubes. The vessel will carry a crew of 371 men and 14 officers. Du Chayla.

The torpedo-gunboat Casabianca, launched at Bordeaux, from the Chantiers de la Gironde, has the following dimensions:—length, 262 ft. 6 in.; beam, 26 ft. 11 in.; extreme draught, 11 ft. 6 in.; displacement, 960 tons. Two vertical triple-expansion engines should give 5000 horse-power with forced, and 3400 horse-power with natural draught, the speed in the first case being 21½ knots. Coal capacity, 116 tons; endurance at 10 knots and at full-speed, 4500 and 500 miles respectively. Armament—one 3·9-in., three 2·56-in., five 1·85-in., and four 1·46-in. guns. The first-named is a bow chaser; one of the 2·56-in. guns fires astern, and the two others are on sponsons. The Casabianca has two masts, two funnels, a forecastle, and a raised poop. The bow rakes aft, the stern forward. The Casabianca has steamed 21·22 knots in her first trial. Casabianca.

We now turn to the ships laid down in 1895. The commerce-destroyer Chateau-Renault has been commenced at La Seyne, after the design of M. Lagane, manager of the Forges et Chantiers de la Mediterranée. The principald imensions are:—length at the water-line, 442 ft. 11 in.; extreme beam at the water-line, 55 ft. 9 in.; depth of hold, 37 ft. 1 in.; mean draught, 22 ft. 6 in.; maximum draught, 24 ft. 3 in.; displacement, 8018 tons. Ships laid down. Chateau-Renault.

The Chateau-Renault will have three screws, worked by three independent vertical engines, and twenty-eight d'Allest boilers. The boilers will be divided into four groups, three of eight and one of four, the latter right forward. With forced draught the engines will

develop 23,000 horse-power, with a speed of 23 knots, and with natural draught 13,800 horse-power, with a speed of 20 knots. In the former case they will show an average of 124 revolutions with a coal consumption of 150 kilogrammes (2·8 cwt.) per square metre of grate.

The Chateau-Renault has a sloping armoured deck formed of plates varying from 0·79 in. thick amidships to 3 in. on the inclined sides. The centre portion is 3 ft. 1 in. above the water-line. A cofferdam filled with coal, &c., extends the whole length of the ship, above the armoured deck. Numerous longitudinal and transverse bulkheads complete the protection. The armament consists of two 6·5-in. guns, one on the poop, the other on the forecastle, six 5·5-in. guns, of which four are in casemates on the quarter-deck and forecastle, and six 1·85-in. guns, all Q.-F. The 6·5-in. guns are protected by steel shields of special construction, 2·13 in. in thickness, as are also the two 5·5-in. guns amidships. The four other guns of the same calibre are on sponsons forward and aft, in casemates protected by 1½-in. plates on the front and sides, and inboard by 0·39-in. plates. The ammunition-hoists will be worked by electricity. No torpedo-tubes are provided. The normal coal capacity of the Chateau-Renault will be 1400 tons, which will give her an endurance of 7500 miles at 12 knots, and nearly 2200 miles at full speed. She will be commanded by an Admiral, and will carry a crew of 600.

The Chateau-Renault may be compared to the Columbia and the Minneapolis. The displacement in each case is almost the same. The estimated speed of the first-named vessel and the trial speed of the two others are practically alike. All three carry a very small armament in proportion to their size, but although they are designed to chase merchant vessels of high speed, it is doubtful whether they would be able to overtake the steamers which cross the Atlantic regularly at an average speed of 20 knots. The fact that the engines of ships of war have to be placed under armoured decks puts them at a disadvantage, besides which the difficulty of conveying coal to the furnaces on board cruisers of 8000 tons will make it almost impossible for such ships to maintain a high speed for a prolonged period. It is otherwise in the case of large mail steamers, where everything is done to facilitate the working of the engines. Moreover, it should be remembered that the Columbia only steamed 18·41 knots on an average during the passage from Southampton to New York, though this was in the summer, and she was not impeded by the bad weather which so frequently prevails during the rest of the year in the North Atlantic. Ships like the Terrible and Powerful would appear to be better fitted to chase large mail steamers than these

cruisers recently laid down in France, or the American commerce-destroyers.

Guichen. The Guichen is of the same class as the Chateau-Renault, and carries exactly the same armament. There is, however, some difference between the dimensions and engine-power of the two cruisers. The Guichen, to be built at the Ateliers et Chantiers de la Loire, after the designs of M. de Bussy, has a length of 436 ft. 4 in.; beam, 54 ft. 10 in.; extreme draught, 24 ft. 7 in.; displacement, 8277 tons. She has three screws, worked by engines of 24,000 horse-power, and 36 d'Allest multitubular boilers. The coal capacity is 1460 tons, capable of being increased to 2000 tons. Coal endurance, 16,000 miles at 10 knots.

Protet. The second-class cruiser Protet, a sister-ship of the Catinat, described in the *Naval Annual* of 1894, has been ordered at the Chantiers de la Gironde. She is sheathed with wood and copper, and is intended for service on distant stations. Her dimensions are:—length, 332 ft.; beam, 44 ft. 7 in.; maximum draught, 21 ft. 2 in.; displacement, 4113 tons, with 9000 indicated horse-power. The speed is to be 19 knots. The boilers are of the Belleville type; the coal capacity is 568 tons. Armament: four 6·46-in., ten 3·9-in., ten 1·85-in., eleven 1·46-in. guns, and two torpedo-tubes. All the guns are Q.-F.

Programme of 1896. The programme of ship-building to be commenced during the current year includes only five vessels, of which three are torpedo-gunboats of small tonnage.

Henri IV. The Henri IV. will be a battleship, or an armoured coast-defence-ship. The preliminary designs for this ship are not yet completed, and the particulars which have already been made public will probably turn out to be incorrect.

Jeanne d'Arc. The Jeanne d'Arc will be laid down during the year at Mourillon, a branch of the dockyard at Toulon. She is an armoured cruiser, and is included in the list of French ships among the first-class cruisers. She will have a length of 469 ft. 2 in.; a beam of 63 ft. 8 in.; a maximum draught of 26 ft. 8 in.; and a displacement of 11,270 tons. Like the Dupuy de Lôme, which she resembles also in other respects, this vessel will have three screws, each worked by a vertical triple-expansion engine. The maximum speed is 23 knots, with 28,000 indicated horse-power. The coal capacity at normal draught is 1400 tons, which could be increased by 1200 tons. The endurance at 10 knots with 2600 tons of coal should be 15,000 nautical miles. The Jeanne d'Arc will be protected by a complete belt, according to the French system, extending to a height of 2 ft. 3 in. above the water-line. The thickness of this belt will only

be 6 in. The space between the upper edge of the belt and the deck above the armoured deck will be protected by 3-in. plates. The armoured deck itself will have a thickness of 2 in., and there will also be a splinter-proof deck.

The armament will comprise two 7·5-in. Q.-F. guns; eight of 5·5-in.; twelve 3·9-in.; sixteen 1·85-in.; and eight 1·46-in. Q.-F. guns; two Maxim guns and two submerged torpedo-tubes. The crew will consist of 578 men and 48 officers.

The designs of the Jeanne d'Arc not being completed, it may be observed that some of the particulars given above cannot be relied upon. The 7·5-in. and 5·5-in. guns will very probably be carried in closed turrets, which will be worked by electricity.

Torpedo-gunboats.

The torpedo-gunboats Dunois and La Hire belong to the same series as the d'Iberville, Cassini, and Casabianca, though they show an improvement in the matter of speed, which is fixed at 23 knots, and also in respect of some modifications of the hull itself. Length, 255 ft. 11 in.; beam, 27 ft. 10 in.; extreme draught, 12 ft. 9 in.; displacement, 896 tons; 6400 indicated horse-power. The boilers are of the Normand type. Coal capacity, 137 tons; endurance at 10 knots, 5000 miles. The armament consists of one 2·56-in. and six 1·85-in. Q.-F. guns. Crew, 120 men and 8 officers.

Destroyer.

M^1 is a torpedo-destroyer of somewhat greater displacement than the new destroyers of the British Navy, and in the matter of tonnage will resemble the Bombe type. The designs are now in course of preparation. The displacement is 375 tons, and speed 26 knots. The boilers are of the Normand type. Armament, one 2·56-in. and seven 1·85-in. Q.-F. guns, and one torpedo-tube. Crew, 60 men.

The list is completed by a sea-going torpedo-boat to be named Cyclone,* which will steam 31 knots, like the Forban, and will be built, like that vessel, by M. Normand, at Havre.

Steam trials.

Passing to the vessels which have completed their trials, we have four armoured cruisers, viz.: the Dupuy de Lôme, the Latouche-Tréville, the Charner, and the Chanzy.

The Dupuy de Lôme, which has been so often alluded to, and to which it is useful again to refer, has steamed 19·8 knots, developing 13,000 horse-power. The trial was, however, made under unfavourable circumstances, the bottom being foul, besides which the trial took place in water which was not sufficiently deep. Allowing for all this, with a clean bottom and under favourable circumstances, the Dupuy de Lôme would have steamed more than 20 knots. In fact, her builder estimates that when provided with new boilers, capable

* Known hitherto as the Tenare.

of developing 15,000 horse-power, a speed of very nearly 21 knots will be attained.

The Latouche Tréville, the Charner and the Chanzy belong to the same group. They have a displacement of about 4750 tons, and are of the Dupuy de Lôme type, but are only protected by armour at the water-line with the view of decreasing the displacement and cost. It will have been observed that by the commencement of the Jeanne d'Arc, the French naval authorities are prepared to adopt for their armoured cruisers larger displacements than that of the Dupuy de Lôme. The Latouche Tréville has steamed 18·19 knots with forced draught, developing 8450 horse-power as against the 8300 horse-power stipulated in the contract. The consumption of coal was 1·6 lb. per horse-power and per hour. In a 24 hours' trial the consumption did not exceed 1·35 lb. per indicated horse-power per hour, while the speed was about 17 knots. The Charner and the Chanzy have shown a speed of 18·23 and 18·31 knots respectively. A vessel of the same type, the Bruix, is now undergoing her trials.

Second-class cruisers.

Two similar vessels, the Chasseloup-Laubat and the Friant, 3402 tons, have completed their trials. The former has d'Allest boilers, while the latter has Niclausse boilers, a type used for the first time on a ship of war. The following results were obtained: With forced draught, 125 revolutions and a consumption of 1·6 lb. of coal per I.H.P. per hour, the Chasseloup Laubat developed 9700 instead of 9000 horse-power, the corresponding speed being 18·77 knots. In the case of the Friant, during the four hours' full-speed trial the consumption of coal was 1·8 lb. per I.H.P. per hour, while 9503 instead of 9000 indicated horse-power was developed. The coal consumption was 122 kgs. (2·4 cwt.) per square metre of grate, the builder being authorised to burn 150 kgs. (2·9 cwt.). The speed attained was 18·891 knots in a rough sea. During the four hours' trial with limited forced draught, the average consumption of coal was 159 kgs. (3·1 cwt.) per square metre of grate, 6701 horse-power being developed. In the twenty-four hours' trial with natural draught about 6000 horse-power was developed, the consumption of coal being 1·7 lb. per I.H.P. per hour, and the speed 17·1 knots.

Very interesting questions of ventilation arose in the course of the trials of the Friant, which have since been disposed of after various experiments to the satisfaction of the French Navy. It may be added that professional opinion is favourable to the Niclausse boilers. The Bugeaud, sister-ship to the two vessels just mentioned, now undergoing her trials, is provided with Belleville boilers.

It will be observed that the French Navy will be in a position to

gain some very useful experience in the above-mentioned types of boilers, under not merely theoretical but practical conditions which are capable of comparison. The three cruisers, Chasseloup-Laubat, the Friant and the Bugeaud, have exactly similar engines, the same horse-power, but water-tube boilers of different systems. The experience thus gained will afford useful information as to the management of the boilers at sea, the best method of stoking, and the maintenance and preservation of the boilers themselves.

Valmy. The armoured coast-defence ship Valmy, sister-ship to the Jemmapes, 6590 tons ,built at St. Nazaire, is now included in the active list. She was expected to develop 8400 horse-power, but the power attained with forced draught being 8954 horse-power, with an average speed of 16·7 knots. The Valmy has joined the northern squadron.

Bouvines. The small battleship Bouvines, which is of the same date as the Valmy, also belongs to the northern squadron. Her displacement is 6610 tons. She was built at La Seyne by the Forges et Chantiers de la Méditerranée. Her trial speed was 16·05 knots with 8800 horse-power.

Linois. The third-class cruiser Linois, also built by the Forges et Chantiers de la Méditerranée, is of 2345 tons and 6600 horse-power, and now forms part of the Mediterranean Squadron. Against a strong north-west wind, that is to say in unfavourable conditions, she steamed 20·5 knots. The coal consumption was remarkable, 1·2 lbs. per indicated horse-power per hour.

The torpedo gunboat Cassini, built at Graville by the same company as the Linois, is of 958 tons displacement and 5000 horse-power. She steamed 21·37 knots on the full speed trial. On the completion of her twenty-four hours' trial, and after the engines had been working continuously for twenty-four hours, a blade of the screw was broken by contact with some floating substance, and the final trial was postponed until the damage had been repaired.

Forban. The Forban, built by M. Normand, holds the record of speed among torpedo-boats and torpedo-destroyers. The dimensions of the Forban are:—length, 144 ft. 4 in.; beam, 15 ft. 3 in.; depth of hold, 10 ft.; extreme draught, 7 ft. 3 in.; load displacement, 136 tons. She is armed with two 1·46-in. Q.-F. guns, and two 14-in. torpedo-tubes. She has two screws, each worked by a vertical triple-expansion engine, and is furnished with two Normand boilers. The estimated horse-power was 3160. At the official trials the Forban steamed 31·029 knots, and consumed 2·61 cwt. of coal per hour. After her acceptance on the occasion of a trial at sea off Cherbourg, the furnaces being worked by stokers of the navy, this torpedo-boat

again steamed 30 knots. She will be attached to the Mediterranean Squadron. Her crew will consist of 32 men and 2 officers.

Germany.

As already mentioned, the opening of the Baltic and North Sea Canal was celebrated with much display, in the presence of the finest international gathering of warships that has been seen for a very long time. The first passage through the Canal by the German and other ships forming part of the official procession took longer than had been foreseen, which was not surprising considering the number of vessels closely following each other and the inexperience of the pilots. About a month later, that is to say, in August, the first division of the squadron of manœuvres, consisting of the battleships Kurfurst-Friedrich-Wilhelm, Brandenburg, Weissemburg, and Wörth, preceded by a torpedo-boat and by the despatch-boat Jagd, passed from Holtenau to Brunsbuttel in eleven hours, thus practically demonstrating the strategical value of the Canal.

Shipbuilding Programme. According to the 1896–97 programme and estimates, a sum of £961,650 is to be expended on ships building and to be built. The battleship to replace the Preussen, the armoured cruiser Ersatz-Leipzig,* and the three protected cruisers, Ersatz-Freya, K, and L, will be proceeded with. A new battleship, to replace the Friedrich der Grosse, two second-class cruisers, M and N, a small cruiser G, a torpedo division boat, and several torpedo-boats, will be laid down. In consequence of recent events, it has been asserted that the German Government proposes to ask for large sums of money for the increase of the navy.

Second-class Cruisers. Three second-class protected cruisers, the Ersatz-Freya, K, and L. have been commenced. Length, 344 ft. 6 in. between perpendiculars; beam, 57 ft.; draught, 20 ft. 6 in., with 500 tons of coal, or 21 ft. 8 in., with 950 tons, the corresponding displacements being 5650 and 6100 tons. There are three screws, worked by three independent engines, in separate engine-rooms. Total horse-power, 10,000. The boilers, of the multitubular type, will be in six compartments. Estimated speed, 21 knots. Protection: an armoured deck, which at a draught of 20 ft. 6 in., is at the ship's side 3 ft. 6 in. below the water-line, and on the horizontal portion is 1 ft. 8 in. above the water-line. The thickness of the armoured deck is 4 in. on the sloping part amidships and for half the length of the vessel, 2¼ to 2¾ in. forward, 2¾ in. aft, and 1½ in. on the level portion. A cofferdam, filled with cork, extends above the armoured deck for a length of 229

* Ersatz—To replace.

ft. 8 in., to a height of 8 ft. 2 in., and a width of 2 ft. 3½ in. Armament: two 8·2-in. guns of 40 calibres, in two revolving turrets, protected by 4-in. armour; eight 5·9-in. Q.-F. guns of 40 calibres, mounted, four in turrets, the four others in casemates, protected by 4-in. plates on the outer and 3·1-in. plates on the inner faces; six 4-in. Q.-F. guns behind shields; six 37-mm. Q.-F. guns, eight machine guns of 8 mm., and three submerged torpedo-tubes, one aft and one on each side amidships. The funnels, at their junction with the decks, are protected by a sloping glacis, formed of 4·7-in. plates. There are two conning-towers, one forward, protected by 6-in. plates, and the other aft, protected by 4·7-in. plates. These cruisers have two masts. The foremast has two fighting-tops and one top for the electric light. The mainmast has only one fighting-top. Each mast carries a 37-mm. Q.-F. gun, and two 8-mm. machine guns. It will be seen that in these vessels the guns are much better protected than the hull. This type, therefore, is intermediate between the armoured cruiser and the ordinary protected cruiser, where the guns are sheltered by screens or mounted in small turrets. The three ships just described are being built, one at Dantzig, at the Government dockyard, the others by contract at Bremen and at Stettin.

Erzatz-Leipzig.

The armoured cruiser laid down to replace the Leipzig has a length between perpendiculars of 383 ft. 9 in.; length over all, 410 ft.; beam, 67 ft.; draught, 26 ft.; displacement, 10,300 tons; I.H.P., 13,000. The hull is of steel and wood. Speed 19 knots. Protection is provided by an 8-in. armoured belt at the water-line, and an armoured deck of from 2 to 3 in. thick. The armament includes four 9·4-in. guns, mounted in pairs, in barbettes, protected by 8-in. armour; twelve 5·9-in., ten 3·5-in., ten 37-mm., eight 8-mm. Q.-F. guns, and five torpedo-tubes.

Erzatz-Preussen

The Pola almanac gives the following particulars of the Ersatz-Preussen, building to replace the Preussen:—Length, 377 ft. 4 in.; beam, 65 ft. 7 in.; mean draught, 25 ft. 7 in.; displacement, 11,000 tons; maximum horse-power, 13,000; speed, 18 knots. According to the *Berlin Post* the armament will comprise four 9·4-in. guns mounted in pairs in two barbettes, eighteen 5·9 Q.-F. guns, six of which will be mounted in casemates and the remainder in turrets, twelve 3·5-in., twenty-four 50-mm., and twelve 37-mm. Q.-F. guns; eight machine guns and six torpedo-tubes. A Harvey steel belt varying from 12 in. to 6 in. in thickness at the water-line will extend for four-fifths of the length from the stem. A turtle-back armoured deck will extend from stem to stern, 2½ in. thick amidships, and 3 in. thick on the sloping portion. The barbettes of the main armament will be protected by 10-in. plates. The turrets of the 5·9-in. guns

will be protected by 6-in. armour, the casemates by armour 4 in. to 6 in. thick. The armour will be of Harvey steel. The three engines will develop 13,000 I.H.P. The speed will be 18 knots. It is apparent from this description that the Erzatz-Preussen will differ considerably from the Brandenburg type. In place of six 11-in. guns she carries four 9·4-in. guns; on the other hand the auxiliary armament is very powerful and well protected. Very considerable modifications have been introduced in the system of protection.

The protected cruiser Kaiserin Augusta has resumed her trials, after extensive repairs necessitated by the weakness of her hull, which has now been strengthened at various points. On her most recent trials the vessel is said to have steamed 21·8 knots, but according to other information this is an exaggeration. Kaiserin Augusta.

The eighth of the series of German coastguard ironclads of the Odin type, viz., the Ægir, has been launched at Kiel. These vessels contain very little wood in their construction. They were originally intended simply for the protection of the entrances to the Baltic Ship Canal, but owing to their excellent sea-going qualities have been passed to the rank of fourth-class battleships. Some of them took part in last year's manœuvres, and were very favourably reported on. The Ægir is 253 ft. long by 48¾ ft. beam, and has a draught of 17¾ ft. Her displacement is 3600 tons, and with her engines working at 5000 horse-power she makes 15 knots. She has a partial armour belt and an armoured citadel, two barbettes with 8-in. armour, a 2-in. deck over the vital parts, and screens for all her guns. The armament consists of three breech-loading 9½-in. Krupp guns, two in the barbette fore and one in the barbette aft, and ten 3⅜-in. quick-firers, besides eight small quick-firers, and four torpedo-tubes, of which two are submerged. Ægir.

The sloop Comet, 1080 tons, 5000 horse-power, attained an average speed of 20·8 knots with forced draught. Comet.

The despatch vessels Hela (ex H.), which was launched in 1895, is nearly completed. Her dimensions are: Length, 328 ft.; beam, 36 ft.; displacement, 2003 tons. With 5400 I.H.P., the estimated speed is 23 knots. The armament consists of four 88-mm. and five 55-mm. Q.-F. guns, and three torpedo-tubes. Hela.

Experiments with *mazout*, a product of petroleum, have been tried on board the Carola, gunnery-ship, and on several torpedo-boats. These experiments were continued on board the armoured coast-defender Siegfried. The Odin, which is a modified Siegfried, has been fitted for the use of petroleum as fuel.

The battleship Deutschland has been reconstructed at Wilhelmshaven, the wood originally employed being replaced by steel and Deutschland.

D

aluminium. The Deutschland has received an armament of Q.-F. guns, and her former rig has been replaced by two military masts.

Two of the Sachsen class, the Baden and Baiern, are being re-boilered and re-engined. The two others will shortly be taken in hand.

The torpedo-boat S. 41, 88 tons, capsized on the 27th August in the North Sea, off Cape Skagen, during the manœuvres. The torpedo-boat division, of which she formed part, was proceeding in single file, the boat S. 41 being the last, when the accident happened. The weather was bad and the sea very rough. The unfortunate vessel shipped several heavy seas, which, descending the funnel, extinguished the fires, whereupon she gave several heavy rolls, and suddenly capsized, floating keel uppermost, in which position she remained for half-an-hour before sinking. The torpedo-boat next to her, though in danger of the same fate, went to her rescue and succeeded in saving the commanding officer and two men. The rest of the crew, sixteen in number, perished. There are about fifty torpedo-boats of the same type in the German navy, all built at Elbing.

Italy.

The naval estimates for 1896 are less in amount than those of previous years. It is nevertheless observable that the actual expenditure will be somewhat seriously increased in consequence of recent events in Africa, which have necessitated the sending to the Red Sea of a strong naval division. The ordinary expenditure for 1896 is fixed at 87,133,689 lire (£3,485,347). It has been stated by certain newspapers that the Italian Government proposes to commence building a fleet of seventy armoured cruisers. It is almost needless to point out that Great Britain alone would be capable of such an effort, and that no other Power could undertake such a feat at any one time; besides which, the reductions made in her naval expenditure show that Italy, so far from increasing her strength at sea, has been compelled to lessen the activity of her shipyards. It is doubtful whether the Regina Margherita and Principe di Napoli, which were to have been built at Taranto and Castellamare, will be proceeded with.

Puglia. The cruiser Puglia has been commenced at Taranto. Length, 273 ft.; beam, 40 ft. 9 in.; 2550 tons; 7000 horse-power; speed, 20 knots. Armament, four 6-in. guns on the upper deck, six 4·7-in. guns mounted on the same deck in the battery, eight 1·9-in. guns, several

of smaller calibre, and two torpedo-tubes. An armoured deck, 1 in. thick, extends the whole length of the ship. The propelling machinery consists of two horizontal triple-expansion engines, with four boilers.

The torpedo-gunboats Agordat and Coatit are of the following dimensions: Length, 308 ft. 6 in.; beam, 30 ft. 6 in.; maximum draught, 10 ft. 8 in.; displacement, 1100 tons.* I.H.P., 7500. A novel feature in this class of vessel is that the entire hull is protected above the water-line by 4·4-in. plates. The protection is completed by an armoured deck with cofferdam. The Partenope, the prototype of the Italian torpedo-gunboat, is of not more than 840 tons displacement, with a speed of only 19 knots. The vessels of the new type will be better protected and armed, and will have a greater speed. Agordat.

The armoured cruiser Vettor-Pisani has been launched at Castellamare. Length, 324 ft. 10 in.; beam, 59 ft.; maximum draught, 23 ft. 7 in.; displacement, 6500 tons; 13,000 horse-power; speed 20 knots. Protection of a partial 6-in. nickel-steel belt at the water-line. Above this there is a redoubt for eight 6-in. Q.-F. guns, protected by 6-in. plates. The deck, forming the upper portion of this battery, is covered with 2-in. plates. An armoured deck of 1½ to 1-in. plates extends the whole length of the ship. The armament includes twelve 6-in. guns, of which four are mounted at the angles of the upper-deck battery, and eight in the armoured redoubt on the main deck, six 4·7-in. and ten 1·9-in. guns, also on the upper deck, several of smaller calibre and five submerged torpedo-tubes, one forward, the others on the side. Two of the 4·7-in. guns are mounted on each broadside between the 6-in. guns, one is mounted on the bow, and another right aft. The broadside guns in the main deck battery are protected from a raking fire by 6-in. bulkheads. A light screen runs fore and aft, and similar screens athwartships in the centre of the battery. The coal capacity is 1000 tons, exclusive of liquid fuel. A similar ship to the above, named the Carlo Alberto, is building at Spezia. Vettor-Pisani.

The Garibaldi, one of the largest ships of the same type, 6840 tons, was launched, on June 27th, at Sestri-Ponente. She was originally intended for the Italian Navy, but was so quickly built and got ready for sea that, by permission of the Italian Government, she was sold to the Argentine Government by the builders, Messrs. Ansaldo, of Genoa, on their agreeing to deliver a second vessel within the time Garibaldi.

* Other dimensions have been published, but those given in the text are probably correct.

originally contracted for, and to fit her with water-tube boilers of the Belleville type in place of cylindrical return tube boilers.

Sicilia.

The Sicilia, which, like the Re Umberto and the Sardegna, is a large armoured cruiser rather than a battleship, recently completed her trials. Her displacement was then 13,375 tons, extreme draught 29 ft., estimated horse-power 19,500. The trials were interrupted by the fracture of a propeller blade. The natural draught trial was of six hours' duration, when the mean power developed was 15,974, and the mean speed on a base of one hundred miles, fifty out and fifty home, a little over 19·2 knots. This result is excellent when it is considered that this was done with the ordinary firemen of the Italian Navy, and without any forcing, the stokeholds not being closed up, and the engines requiring no water service whatever. A preliminary trial was made with assisted draught, with good results; but affairs in the East were so threatening that a division of the fleet was sent to the Sea of Marmora, and the Sicilia taken into the dockyard to be prepared with all speed for commissioning, men working day and night upon her, so further trials were deferred until she was absolutely complete and ready for sea.

Marco Polo.

The Marco Polo, built at Castellamare, was finally completed and commenced her trials in November, 1895, but although the engines gave considerably more power than that contracted for, the speed of the vessel was very disappointing. She was originally designed for an unarmoured cruiser of the Piemonte type, but it was decided to give her armour, and she was lengthened accordingly. The following are the particulars of her official trials:—

	Natural draught.	Forced draught.
Date of trial	23rd December, 1895.	20th January, 1896.
Duration of trial . . .	10 hours.	3 hours.
Power contracted for . .	6000	10,000
Mean power developed . .	7047	10,664
Maximum power developed.	7778	11,795
Mean revolutions . . .	126	140
Maximum speed in knots .	17·25	19
Displacement 4650.	Mean draught 19 ft. 4 in.	

The Marco Polo is the last of the vessels for which the Italian Naval Authorities have given premiums, Messrs. Ansaldo, of Sampierdarena, the constructors of the engines (from the designs of Messrs. Maudslay, of London) receiving over £6000 more than the contract price, on account of the extra power developed. The Italian Naval Authorities have since decided to abandon this practice in future, whilst retaining, however, fines both for deficiency of power, excess of weight of machinery, and excess of consumption of fuel on trial.

The protected cruiser Elba, 2730 tons, 6500 horse-power, has been commissioned. Principal armament, four 6-in. and six 4·7-in. guns. With natural draught and 4928 horse-power this vessel steamed 15·9 knots; with forced draught and 7471 horse-power the speed was only 17·9 knots, which was much less than that estimated. The Elba is sheathed with wood and copper. Elba.

The original duration of the natural draught trials of these vessels was twenty-four hours, but as this was afterwards considered to be longer than necessary it was reduced to ten hours. The Liguria, however, was the only one of the class that made a trial of this length, the constructors of the other vessels preferring to accept a trial of only six hours, any fine or premium for consumption being eliminated; but the constructors of the Liguria, on the advice of Messrs. Maudslay, of London, the designers of the machinery, accepted the ten hours' trial, and not only realized a mean H.P. over that contracted for, but also obtained a considerable premium for consumption of fuel.

The torpedo-cruiser, Caprera, 893 tons, 4000 horse-power, attained 17·79 knots with natural draught and 2200 horse-power, and 20 knots with forced draught and 4190 horse-power. Caprera.

Experiments with the submarine-boat Delfino, which is 49 ft. long, have been continued at Spezia. They are said to have been satisfactory, and several more boats of this modified type are in construction. The speed of the Delfino under water is 10 knots. Delfino.

A torpedo-destroyer of 28 knots, suggested by the English types, has been ordered at Sestri-Ponente.

It should be mentioned that a serious boiler explosion took place on board the sea-going torpedo-boat Aguila, causing the loss of five lives. This accident was caused by the giving way of the crown of the boiler. A small torpedo-boat, used in connection with the custom house, was lost during a gale on Lago Maggiore.

Russia.

The Russian Navy Estimates for 1896 amount to 57,966,600 roubles (£6,440,666), as against £6,102,612 for 1895. The former sum includes £2,033,386 for new construction and £1,012,289 for ships in commission. In 1895 a sum of £2,120,604 was included for new construction and £799,421 for ships in commission. In 1886 the expenditure, in round figures, on the Russian Navy was £4,888,888. The amount has therefore increased by more than £1,444,444 in the ten years.

Sevastopol. During the past year several ships have been launched. The battleship Sevastopol was launched on June 1st, 1895. She is a sister ship to the Petropavlosk and Poltava, launched in November, 1894. Length, 367 ft. 6 in.; beam, 70 ft.; extreme draught, 26 ft.; displacement, 10,960. Her engines are intended to develop 10,600 horse power. Estimated speed, 17·5 knots. The ship is protected by a 15¾-in. belt at the water-line, and by a 3½-in. armoured deck. The armament comprises four 12-in. guns, mounted in two barbettes, protected by 10-in. Harvey steel, twelve 6-in. Q.-F. guns, eight mounted in pairs in turrets, and four mounted on the main deck in casemates, twenty-four smaller guns, and six torpedo-tubes. All three vessels have their machinery on board, which is an exact copy of that made by Messrs. Maudslay, Sons and Field, for the George the Victorious, and will be ready for trial in the present year.

Khrabry. The dimensions of the gunboat Khrabry, launched at the Nouvelle Amirauté, St. Petersburg, on November 21st, 1895, are:—Length, 229 ft.; beam, 41 ft. 7 in.; draught, 11 ft.; displacement, 1492 tons. The engines, worked by eight Niclausse water-tube boilers, should develop 2000 horse-power with a speed of 14 knots. Armament:—One 9-in., one 6-in., and eight small Q.-F. guns. The Khrabry is of the same type as the Otvazny and Grozjastchy. The machinery is not yet in place.

A small gunboat was laid down on the slip, from which the Khrabry was launched, on December 18th.

Vierny. The school-ship Vierny, built at the Baltic Works (length 223 ft., beam 36 ft., draught 11 ft., 1280 tons, 500 horse-power), is a fully-rigged vessel, and was launched on the same day as the Khrabry, in the presence of the Czar. Armament:—Six 4-prs. and several guns of smaller calibre. She is sister ship to the Voin, built at Mortala in 1893, and is to be completed in May.

Sokol. On the 22nd August the torpedo-destroyer Sokol was launched at the Yarrow Works. The principal dimensions are:—Length, 190 ft.; beam, 18 ft. 6 in.; draught, 7 ft. The following is taken from the *Times*:—"Her hull, which in form is somewhat finer than that of the Havock or Hornet, is constructed of nickel steel, a material of greater strength than the steel in ordinary use for such vessels, but aluminium has been largely introduced in places where great strength is not of primary importance (*e.g.* in the hatches, lids of coal bunkers, cylinder casings, etc.). The propelling machinery and boilers are very similar to the Hornet's, but greatly improved in numerous minor details, which collectively form an important element in the speed attained by this vessel, and it is to these details that the success of the Sokol is mainly attributable. The engines, which are

capable of developing upwards of 4400 I.H.P., and in the construction of which bronze has been freely used (combining as it does strength with lightness), are of the triple expansion twin-screw type, and the boilers are Yarrow's patent straight water-tube ones with steel tubes. A feature in the boiler arrangements of the Sokol which is intended to add to the safety and security of the stokers when the vessel is in action is the enclosure of the boilers in special compartments by cross bulkheads, thus isolating them from the stokehold and avoiding the possibility of steam escaping into it should the boilers be pierced by shot. The arrangement of the space forward, below the deck, is similar to that usually adopted in the British Navy, that part of the vessel being appropriated to the crew, but in the after part abaft the engine-room there is a distinct departure from British practice, the accommodation for the officers being a decided improvement on that of the Havock and Hornet, the alteration in this respect having been determined by the Russian naval authorities. The armament of the Sokol consists of one 12-pr. Q.-F. gun on the steering tower forward and three 6-pr. similar guns on deck. There are also two swivel deck torpedo-tubes for firing 16-in. torpedoes over either beam, but no bow tube, as it is now generally discarded. The coal carrying capacity is sixty tons, which is sufficient to steam across the Atlantic at the rate of ten knots. The trials of the vessel, which were highly successful, were attended by a Russian commission of naval experts. The mean speeds attained by the vessel in the runs on the mile were as shown in the following table:—

	Speed in knots.	Mean speed.	Revolutions per minute.	Mean revolutions.
First three runs	29·445	29·773	398·8	405·05
Last three runs	30·102		411·3	

similar mean results being obtained for the work done during the two and a quarter hours' running of the vessel when off the mile. The mean air pressure in the stokeholds during the mile runs was equal to 1·12 in. of water, and the highest registered during the two and a quarter hours' run never exceeded $1\frac{3}{8}$ in. The mean I.H.P. developed by the engines during the trials was 3700, obtained with steam of 160 lb. pressure per square inch in the boilers." After her trials the Sokol sailed for the Baltic, exhibiting excellent sea-going qualities in a rough sea.

Volunteer Fleet.

At the establishment of Messrs. Hawthorn, Leslie, and Co., Hebburn-on-Tyne, a large steamship, the Kherson, has been built for the Volunteer Fleet, of 10,000 tons displacement, 12,500 horse-power, and 19·5 knots speed. She has two screws, 1400 tons liquid

fuel capacity, and 24 Belleville boilers. The Kherson is well subdivided: she has 12-in. bilge pipes as well as large sluices, and is able to free herself of 4,000 tons of water an hour. Her armament consists of 24 4·7-in. 6 pr. and 3 pr. quick-firers. At Messrs. Thomson's yard, Clydebank, the Kiev, of 5000 tons, has been built for the same fleet. Two other steamships, the Ekaterinoslav and the Voronesh, also built in England, have recently been launched. For all these ships portable magazines have been arranged, so that ammunition and guns can be shipped at short notice. The Volunteer Fleet can now muster fourteen ships, of which five are of high speed, and are ready at any moment to be transformed into auxiliary cruisers.

Rossia. The large armoured cruiser Rossia will probably be launched in May. Her dimensions are:—Length, 473 ft.; beam, 68 ft.; mean draught, 26 ft.; displacement, 12,200 tons. She has three engines and three propellers, the centre engine developing 3000 and the side engines each 7500 I.H.P. or a total of 18,000 I.H.P. The armoured belt is 10 in. in thickness, extending over four-fifths of the length at the water-line, the ends of which are united by two transverse bulkheads of 9-in. armour. The armoured deck is 2·8 in. in thickness. The armament consists of four 8-in. guns, mounted in projecting barbettes on sponsons, two forward and two aft; sixteen 6-in. Q.-F., two of which fire ahead and two astern from indented ports, the remainder being mounted on the broadside, and six 4·7-in. Q.-F. guns, besides smaller pieces. The boilers are of the Belleville pattern, and will be fitted for the use of petroleum.

Oslabya. Peresviet. The battleships Oslabya and Peresviet were laid down on November 21st, the former at the Nouvelle Amirauté, the latter at the Baltic Works. Length over all, 434 ft. 6 in., and between perpendiculars, 401 ft. 3 in.; beam, 70 ft. 6 in.; draught, 26 ft.; displacement, 12,674 tons. These vessels will have three engines of 14,500 horse-power, developing a speed of 17·5 knots, and water-tube boilers. Protection, a belt at the water-line, 9 in. thick amidships, 5 in. forward, and 6 in. aft. Armament, four 10-in. guns, in pairs, in two turrets; eight 6-in. Q.-F. guns, mounted on two decks in armoured casemates, and twenty-two guns of smaller calibre. The coal capacity is 1750 tons. A third battleship of similar type will shortly be laid down on the slip where the Rossia is now building.

Svietlana. The cruiser Svietlana is building at Havre, at the Chantiers de la Méditerranée. Length at the water-line, 331 ft. 4 in.; beam, 42 ft. 7 in.; extreme draught, 18 ft. 9 in.; displacement, 3828 tons; 8500 horse-power; speed, 20 knots; coal capacity, 400 tons. The hull will be sheathed with wood and copper. She will be provided with two

vertical triple expansion engines and eighteen Belleville boilers, arranged in three groups of six each. 8500 horse-power should be developed with natural draught, produced by means of ventilators. This will give 128 revolutions, with an atmospheric pressure of 5 in., and a pressure in the cylinders of 26·4 lbs. This vessel has an armoured deck 1 in. thick on the horizontal portion, and ¾ in. to 1¾ in. thick on the sloping portions. There is a cofferdam above the armoured deck. The conning-tower is protected by 4 in. steel plates. The armament comprises six 6-in. Q.-F. guns, ten 47-mm. Hotchkiss guns, and four torpedo-tubes. The guns are distributed as follows: one 5·9 in. gun on the forecastle, six 47-mm. guns on sponsons, three on each side, one 5·9 gun aft. On the battery deck are mounted two 5·9 guns firing ahead, and two of the same calibre firing astern; two 1·5 guns a little abaft the cat-heads, and two of the same calibre right aft. The guns are protected by shields of hardened steel. There is one torpedo-tube in the stem, another at the stern-post, and two others on the broadside. Suitable accommodation will be provided on board this vessel for a Prince of the Imperial Family.

The laying down in the near future at St. Petersburg of two protected cruisers, is announced.

A gunboat of 963 tons, for service in the far East, will be built on the Neva. A Russian shipyard has received the order for a torpedo destroyer of the Sokol type. Finally, eight first-class torpedo-boats of 120 tons—Pernoff type—are building on the Neva. Two boats of this class are about to commence their trials. The eight just referred to are progressing rapidly.

The Admiral Oushakoff has completed her official trials. She is the first vessel of a class which is specially designed for coast defence, but which can also be utilised for foreign service. She has been constructed at the Baltic Works at St. Petersburg, where her keel was laid on June 16th, 1892, and the vessel launched October 27th, 1893. Her length between perpendiculars is 278 ft. 9 in.; over all, 283 ft. 6 in.; beam, 52 ft.; mean load draught, 17 ft.; displacement, 4126 tons. A complete belt of armour, 6 ft. 7 in. in depth, protects the water-line. This belt is 10 in. thick amidships, and tapers to 8·8 in. forward and 7·8 in. aft. An armoured deck assists to protect the vitals of the ship. Armament, four 10-in. guns in two armoured turrets, four 6-in. Q.-F. guns, twenty-four small calibre Hotchkiss, and four torpedo-tubes. On the twelve hours natural draught run with open stokeholds, 5764 horse-power, instead of 5000, was obtained, while the mean speed was 15 knots. The trial was made in the presence of the Russian Technical Committee, and under the direction of

Oushakoff.

Mr. John Sampson, of Messrs. Maudslay, Sons and Field, the constructors of the machinery. The estimated speed with natural draught was 14 knots, and with forced draught 16 knots.

The Rurik, which has been frequently referred to, completed her official trials in the course of last spring (1895) when she steamed 18·73 knots, with a displacement of 9957 tons. Although the Rurik may be regarded as a modern armoured cruiser, the absence of better protection for the broadside guns has been much criticised, as in the ships of much older date.

The Navarin and Gheorghy Pobyeodonosets have been completed. The Three Saints (Tri Sviatitelia) is approaching completion.

The transport Samoyed, built in England, for surveying service, completed her trials in the Thames, where she steamed 12·5 knots with 1495 horse-power. This vessel is armed with four 47-mm. and four 37-mm. guns.

The first-class torpedo-boat Viborg is being fitted for trial with naphtha fuel under the superintendence of a special commission.

Austria-Hungary.

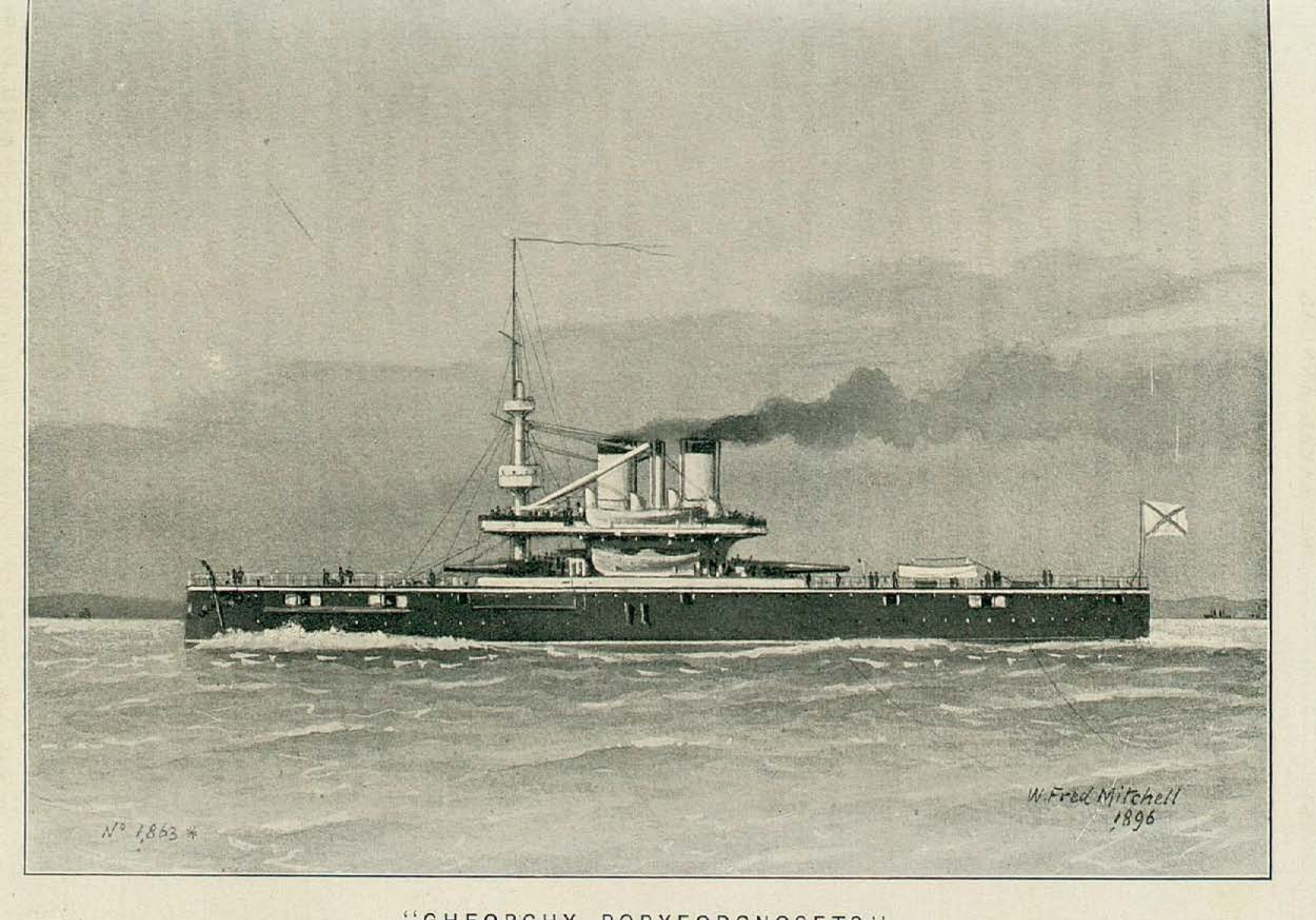
The Navy Estimates for 1896 amount to 33,700,150 frs. (£1,348,006), being an increase of 1,250,000 frs. (£50,000) on those of the preceding year. Provision is made for the construction of an armoured cruiser of the Kaiserin und Königin Maria Teresa type, one cruiser of 2000 tons, one torpedo-gunboat of 500 tons, and six sea-going torpedo-boats.

Maria Teresa.

The Kaiserin und Königin Maria Teresa, 5270 tons, has completed her trials. With ordinary draught, during a five hours' trial, she attained a mean speed of 17·13 knots, developing 5880 horse-power. With forced draught, during four hours, with 9755 horse-power and 119 revolutions, the speed was 19·349 knots. The estimated speed was 20 knots, with 10,000 horse-power.

Coast defence ships.

The armoured coast defence ships, Monarch, Wien, and Buda Pesth, have been launched, the first at Pola, the two others at San Rocco, near Trieste. The principal dimensions, &c., of this type are: Length, 305 ft.; beam, 55 ft. 9 in.; mean draught, 21 ft.; displacement, 5550 tons; I.H.P., 8500 with forced draught; speed 17·5 knots. The hull is of Siemens-Martin steel. The water-line is protected by an armoured belt of 10·6 in. thick amidships, tapering to 8 in. aft, and 4·7 in. forward. This belt, which is of nickel-steel, extends to the bows, covers five-sixths of the length, and is terminated aft by an armoured bulkhead 7·8 in. thick. The depth of the belt is 6 ft. 10 in.



"GHEORGHY POBYEODONOSETS,"

RUSSIAN BATTLESHIP.

An armoured deck, varying from 1½ in. to 2¼ in., rests on the upper edge of the belt. Abaft the armoured bulkhead, a second deck of 2½ in. armour protects the steering gear. The armament comprises four 9·4-in. guns, mounted in pairs in two turrets, protected by 10·6-in. plates, one forward and the other aft; six 5·9-in. Q.-F. guns in the armoured redoubt, fourteen 47-mm. guns, two machine guns, and two torpedo-tubes. The large guns are worked by electricity. The 5·9 guns are mounted in a battery, protected by 3-in. plates, two firing ahead and two astern. The 47-mm. guns are distributed on the flying deck. The hull weighs 1710 metric tons, the armour 1620, the engines and boilers 850, the guns and torpedoes 610. At normal displacement the coal capacity is only 200 tons, but the bunkers can hold 500 tons. These ships have a ram and a military mast. Belleville boilers have been ordered for the Wien from Messrs. Maudslay.

The armoured cruiser already referred to, of the modified Kaiserin und Königin Maria Teresa type, has been ordered at San Rocco. Length, 367 ft. 6 in.; beam, 56 ft.; draught, 20 ft. 3 in.; displacement, 6100 tons, 12,500 horse-power. She will have water-tube boilers, and a speed of 20 knots. The protection includes a belt of 10·6-in. armour, a casemate protected by 10-in. plates, and an armoured deck. The armament will be similar to that of her prototype, namely, two 9·4-in. Krupp guns, in two barbettes, one forward and one aft, worked by electricity, eight 5·9-in. Q.-F. guns, and several of smaller calibre.

The designs of a torpedo-cruiser, to replace the Greif, of 2200 tons displacement, are in course of preparation. A torpedo-gunboat of 510 tons, 9700 horse-power, and 24 knots speed, is building.

Denmark.

The Navy Estimates for 1896 amount to 7,477,048 crowns (£416,503). They provide for the construction of a coast-defender of the Lindormer type, two first-class torpedo-boats, and four torpedo-scouts. The small battleship Skjold is being proceeded with. This vessel will carry four guns, viz., one of 9·4 in. and three of 4·7 in. in closed turrets, worked by hand or electricity. Only the 9·4-in. gun will be loaded by electricity. The third-class cruiser Heimdal, of 1280 tons, has undergone satisfactory trials, attaining a speed of 17·5 knots.

A somewhat lively opposition has been shown to the action of the Government in connection with the general plan of defences at Copenhagen. One party, which seems to be gaining ground,

demands an increase in the votes for the navy, even though this should necessitate a reduction in the army votes. Should their arguments prevail, the defence of Copenhagen would require a large number of armoured coast-defence-ships and torpedo-boats. It may be added that the organisation of the Danish system of coast defence is admirable, and is worthy of imitation. The mobilisation of the torpedo-boats is effected with a rapidity and a precision which could not be surpassed.

Holland.

The three new cruisers referred to in the *Naval Annual* for 1895 will be named the Holland, Zeeland, and Friedland. Length between perpendiculars, 291 ft. 3 in.; length over all, 304 ft.; beam, 46 ft. 6 in.; draught with 400 tons of coal on board, 17 ft. 6 in.; displacement, 3900 tons; draught with 800 tons of coal on board, 18·6 ft. These vessels will be protected by a 2-in. armoured deck. The conning-tower will be covered with 4-in. steel plates. With forced draught the estimated horse-power is 9000, the two engines indicating 145 revolutions, and the speed being 20 knots. The coal capacity is 3200 miles at 10 knots. A special feature of these ships is that they will have two kinds of boilers, viz., two cylindrical boilers of 2500 horse-power, to be used under ordinary circumstances when proceeding at moderate speed, and eight Yarrow boilers, which will increase the horse-power when high speed is necessary to 6500. Armament, two 5·9-in. Q.-F. guns, one forward and one aft, six 4·7-in. guns on the broadside, four 57-mm. and eight 37-mm. guns, and four torpedo-tubes.

The estimates for 1896 amount to £1,563,333, as against £1,451,124 in 1895. The programme includes the laying down of three small battleships, closely resembling the Evertsen, Kortenaer, and Piet-Hein, launched in 1894. Eight gunboats of 200 tons, and six gunboats of 450 tons, intended for home defence, are projected.

Norway.

The Norwegian Chambers have voted an extraordinary credit of 12,000,000 crowns, (£666,000), of which £444,000 are to be used for the construction of two small battleships, ordered in Germany, and three torpedo-boats. The principal dimensions of the battleships are: Length at the water-line, 274 ft. 9 in.; beam, 48 ft. 6 in.; draught, 16 ft. 10 in.; displacement, 3403 tons; I.H.P., 3700 with natural draught; speed, 15 knots, or with forced

draught, 16 knots. Armament, two 9·8-in. guns mounted in barbettes, forward and aft, four 4·7-in. Q.-F. guns, and sixteen of small calibre. The four monitors Mjolwer and Thrudvang, 1515 tons, Skorpionen, 1447 tons, and Thor, 2003 tons, of very ancient construction, are to be repaired and armed with new guns in place of their Armstrongs.

Portugal.

A patriotic subscription was opened at Lisbon last year, with the proceeds of which a third-class cruiser, to be called the Adamastor, was ordered from Messrs. Orlando, and is now building at Leghorn. Length, 242 ft. 9 in.; beam, 35 ft.; draught, 14 ft.; normal displacement, 1993 tons, or with 270 tons of coal, 1750 tons. Two vertical triple-expansion engines and four boilers will give 3000 horse-power with natural, and 4000 horse-power with forced draught; the corresponding speeds being 17 and 18·5 knots. Armament, two 5·9-in., four 4-in., and two 47-mm. Q.-F. guns, four machine-guns, and three torpedo-tubes, one in the bows and two on swivels amidships.

The gunboat Dom Luiz, of 721 tons and 10 knots speed, has been launched. Armament, four 4-in. and one 69-mm. Q.-F. guns, and two machine-guns. The gunboat Salvator Correa has also been launched. The Portuguese Government has ordered abroad a protected cruiser of the Yoshino type, of 22 knots speed, two torpedo-gunboats of the Onyx type, and a tug-boat of 400 tons.

Spain.

The Spanish Navy suffered serious disasters in the course of last year. The cruiser Reina Regente, of 5000 tons, 12,000 horse-power, was totally lost, with all on board, on the 10th March 1895, between Tangiers and Cadiz. The vessel left Cadiz on March 9th with the Moorish envoys on board, who were landed the same day at Tangiers. She sailed again the next morning for Cadiz to take part in the ceremony of the launch of the Carlos V. Nothing more was ever heard of her. Two vessels reported having passed a cruiser in distress in the Straits of Gibraltar, but beyond this no information ever came to hand respecting the unfortunate ship. During the 10th March a most violent hurricane was blowing on the coasts of Spain, and as the Reina Regente carried a heavy deck-load in the shape of her four 9·4-in. guns, and had only taken just sufficient coal for the voyage to Tangiers and back, it is assumed that she capsized. No

trace of her was ever again found. The Reina Regente will be replaced by a cruiser to be shortly laid down.

Three other vessels were shortly afterwards lost—(1) the Cristobal Colon, 1130 tons, 14 knots, which was wrecked on the coast of Cuba; (2) the cruiser Sanchez Barcaiztegui, 935 tons, 13 knots, which sank after collision outside the port of Havanna, with Admiral Parejo on board; and (3) the small gunboat Iajo, 86 tons, lost on the coast of Spain. The construction of a protected cruiser and two torpedo-boat destroyers has been authorized in place of the vessels lost. The latter, which are to be named the Terror and Furor, are building at Messrs. Thomson's yard at Clydebank. The estimated displacement is 370 tons, and the speed 28 knots. They will be armed with six Q.-F. guns and two torpedo-tubes. Complement, 63; coal capacity, 80 tons. The third-class cruiser, building at Kiel for China, is to be bought by the Spanish Government.

Carlos V. The armoured cruiser Carlos V. has been launched at the Vea Murgia yard at Cadiz. Length between perpendiculars, 380 ft.; length over all, 404 ft. 2 in.; beam, 67 ft.; depth of hold, 39 ft. 8 in.; maximum draught, 25 ft. 6 in.; displacement, 9255 tons. Two vertical triple-expansion engines, of 15,000 horse-power with natural, and 18,500 horse-power with forced draught, will give speeds of 19 and 20 knots respectively. The coal endurance is 12,000 miles. Protection is afforded by a 2-in. armoured belt, extending for 167 ft. of the length, terminating forward and aft in bulkheads, 6 ft. in height, covered with 2-in. plates, and by a 2-in. armoured deck. The armament includes two 11-in. guns, eight 5·5-in., four 3·9-in., and two 2·7-in. Q.-F. guns, four Nordenfelts, four revolver-guns of similar calibre, and six torpedo-tubes. The 11-in. guns are mounted in barbettes, one forward and the other aft, protected by 10-in. steel plates. The turrets are surmounted by 4-in. steel turtle-backs. The ammunition-hoists are protected by 8-in. armour. The design of the Carlos V. was suggested by that of the Blake and the Blenheim.

The cruiser Almirante Oquendo, of 7000 tons displacement, has completed her trials. She is the last of a group of three cruisers, built at the Nervion shipyard, Bilbao, the two others being the Infanta Maria Teresa and the Vizcaya. With natural draught for six hours and 109 revolutions, the engines developed 9000 horse-power and gave the ship a speed of 18·49 knots. With forced draught for one hour, the results were: revolutions, 117; horse-power, 13,700; speed, 20·25 knots.

Two destroyers of 28 knots speed and of a larger and more powerful type than the first English destroyers, have been ordered from Messrs. Thomson of Clydebank. They will make their trials with

75 tons of coal on board. A group of seven gunboats of 300 tons, for service off the coast of Cuba, have been built for the Spanish Government by the same firm. Length, 136 ft.; beam, 26 ft.; draught, 11 ft.; armament, two small Q.-F. guns, and two torpedo-tubes. These gunboats have been completed in less than three months, and were despatched to Cuba last autumn. They are named respectively the Pizarro, the Velasquez, Herman Cortez, Vasco Minaz de Balbao, Ponce de Leon, Alvarado, and Sandoval.

Another group of small gunboats of 40 tons, with water-tight compartments, steaming 10 knots, and armed with one Q.-F. and one Maxim gun, have also been built for Cuban waters.

Sweden.

The Swedish Government has asked for votes for the construction of three battleships, several cruisers, six torpedo-destroyers, and some torpedo-boats. Notwithstanding the union of the two kingdoms, the additions, now being made to the Norwegian navy, are a matter which commands attention.

The small battleship Odin, of 3325 tons, 3700 horse-power, and 16 knots speed, will shortly be launched. The torpedo-gunboat Orn, of 700 tons, 4000 horse-power, and 19 knots speed is building. She is to carry an armament of two 4·7-in. and two 57-mm. Q.-F.

Greece.

It has just been decided to increase the armament of the three small battleships Hydra, Psara, and Spetzai, of 4889 tons, and 17 knots speed, launched in 1889 in France. Besides their present armament these vessels are each to have one 3·9-in. Q.-F. gun of fifty calibres, with 2624 ft. initial velocity, which will be mounted in a port in the bows, and eight Q.-F. guns, of fifty calibres, to be distributed on the deck. These guns will all be of the Canet pattern.

United States.

As a consequence of the Venezuela incident, and of President Cleveland's action in reference thereto, resolutions have been moved in Congress for the increase of the navy. It is therefore clear that the feelings aroused by the events of last year, though of a superficial

character, will lead to marked augmentation of the naval strength of the great American Republic.

The most interesting features in the history of the United States Navy during the past year are the voyage made by the Columbia across the Atlantic at a mean speed of over 18 knots, and the laying down of the battleships Kearsage and Kentucky, the designs for which contain some rather curious innovations. The following description is extracted from the Journal of the United Service Institution:—

Kearsage and Kentucky.

"The fifty-third Congress authorized, on March 2nd, 1895, the construction of two first-class battleships, the Kentucky and the Kearsage, to cost when completed about £1,000,000. They will be built by the Newport News Ship Building Co.

"Length on the water-line, 368 ft.; beam, extreme, 72 ft. 3 in.; freeboard, forward, 14 ft. 2 in.; aft, 12 ft. 3 in.; mean draught, 23 ft. 6 in.; displacement, 11,500 tons; speed, 16 knots; I.H.P. 10,000; normal coal supply, 410 tons; total coal capacity, 1210 tons. The latter will enable the vessel to steam 6000 miles.

"The vessels are to be driven by twin-screws, the engines to be of the vertical triple-expansion type, one on each shaft. The boilers, five in number (three double-ended and two single-ended, in four compartments), will generate the necessary steam at a pressure of 180 lbs. to the square inch. The protection of the water-line will be assured by an armour belt of a maximum thickness of 16½ in., with a mean depth of 7½ ft., so disposed that the vessel, with 410 tons of coal on board, will have 3½ ft., and with 1210 tons of coal will have 2 ft. of the belt armour above the water-line. The belt will extend from the stem to the after barbette, and will maintain the maximum thickness from the after end of the belt to the forward boiler-room bulkhead, whence it will taper gradually to a thickness of 4 in. at the bow. From the armour belt to the main deck the ship's side will be protected by 5-in. steel armour from barbette to barbette. On the top of the main side armour belt will rest a flat steel deck, 2¾ in. in thickness, and forward and abaft the machinery and boiler spaces the deck will be inclined at the sides, the thickness being increased to 3 in. and 5 in. To further protect the ironclads against raking fire, bulkheads of armour, 10 in. and 12 in. thick, will be worked at the after end of the thick armour and at the point forward where it begins to taper.

"Cofferdams filled with compressed fire-proofed American corn pith cellulose will be worked the entire length of the vessel in the region of the water-line. Throughout the vessel the use of wood is reduced to a minimum.

"The armament comprises four 13-in. and four 8-in. B.L.R., fourteen

5-in., twenty 6-pr., and six 1-pr. Q.-F. and four machine guns, one field gun and five torpedo-ejectors, two on either broadside and one in the bow. A novel feature of these ships is the double turret, the upper part of which contains two 8-in. and the lower two 13-in. guns. Both parts of the double turret must be turned together. There will be one double turret forward, another aft. The gun positions will have complete armour protection from a distance of 4 ft. below the water-line to the top of the 8-in. turrets. The lower portion of the protection will be 15 in. in thickness, the armour of the 13-in. gun turrets will be also of 15 in., except immediately in front, where it will be made 17 in. The armour protecting the 8-in. guns will be 9 in., but will be 2 in. heavier immediately in front. The fourteen 5-in. guns will be mounted on the main deck between the turrets, and will be protected by continuous armour 6 in. thick, a splinter-proof bulkhead 2 in. thick being fixed between each gun station. The 6-pr. and 1-pr. guns will be placed where they can fire to advantage. The conning-tower will have armour 10 in. in thickness, with a tube 7 in. in thickness leading down to the armour deck for the protection of voice pipes, telegraphs, steering rods, etc.

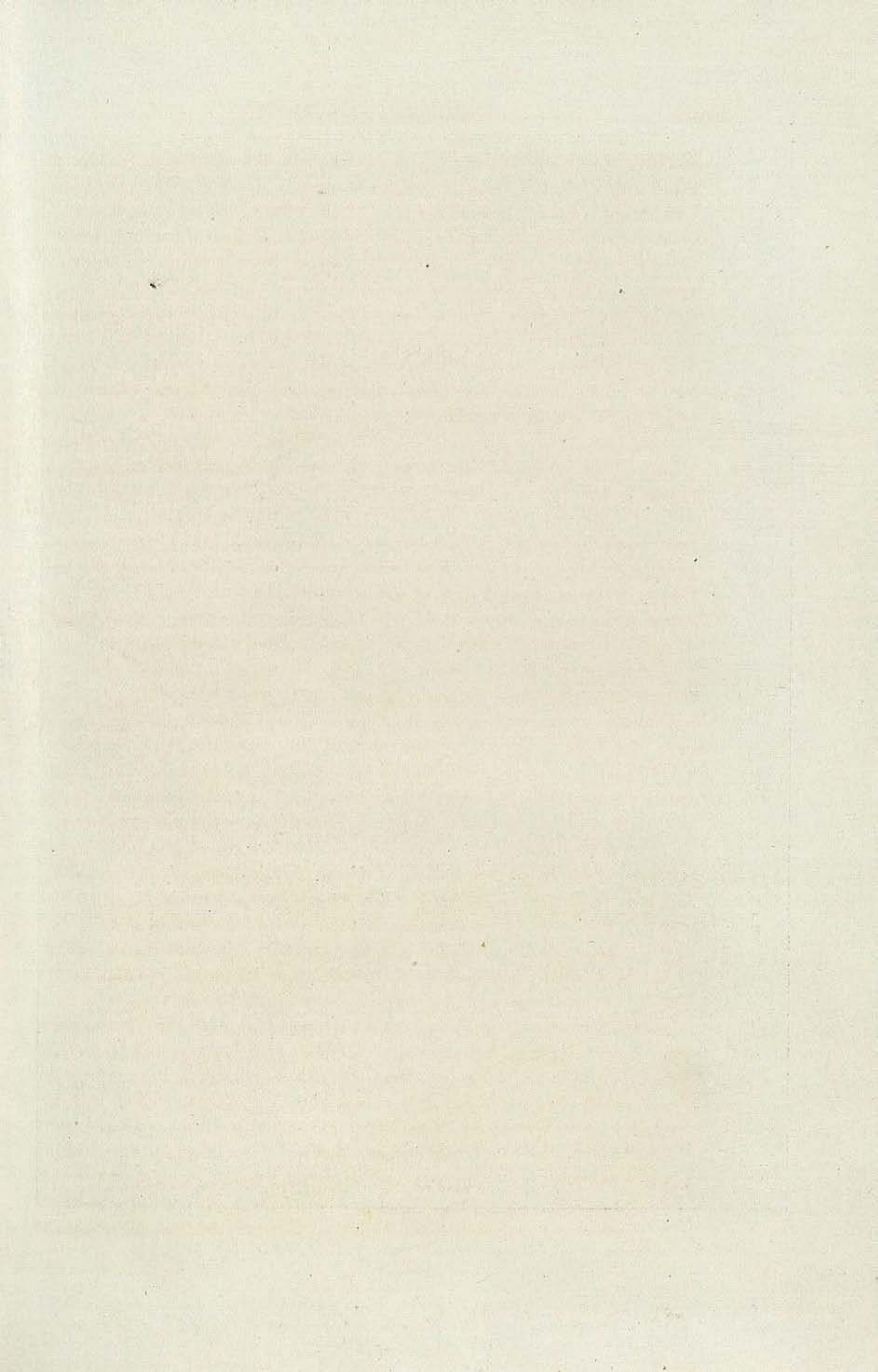
"In appearance the battleships Kearsage and Kentucky will resemble the Indiana class more than the Iowa, but the single huge mast of the Indiana will be replaced by two lighter masts, and the short smoke-stacks of the Indiana will be lengthened in order to enable more power to be developed and better speed maintained when working under natural draught. Their complements will be 520 persons—officers, bluejackets, and marines. The time fixed for the completion of these vessels is three years."

These ships are very strongly built and of great beam, speed being sacrificed to protection and coal capacity. On this point the American architects differ entirely from those of Europe. The chief feature deserving attention is, however, the formidable armament of these two vessels. The large guns, by the system of mounting above described, are divided between two stations, one forward and one aft, each containing four guns, the movements of which are controlled by a single pivot. Those who are already disposed to criticise the almost universal system of distributing guns on board battleships, that is to say, the plan of mounting them in pairs in two turrets, will not fail to point out that the Americans have adopted an even more objectionable system, in thus putting four eggs into the same basket, inasmuch as a successful shot from the enemy might disable four guns at once. Moreover, in the mode of construction rendered necessary by the placing of one turret upon the top of another, the range of fire of the guns in the lower turret has to be reduced, which

is equally open to criticism. Finally, the concentration of the principal guns in two stations affords ground for another even more important objection. The four guns being laid by the same horizontal movement, a mistake in the aim might cause the whole of the projectiles to miss the mark, owing to a sudden lurch or other movement of the ship. It should not be forgotten that it is not always easy to point a gun satisfactorily in a closed turret; and also that everything tending to complicate the working of the guns in action will be a serious drawback. Special efforts have been made in the constructors' department at Washington, where these vessels were designed, to give them great steadiness of platform.

Brooklyn. The Brooklyn, 9150 tons, was launched in October. A full description of this armoured cruiser, the largest of the American Navy, was given in the *Naval Annual* of 1893 (pp. 45 and 47). She is about 1000 tons larger than her prototype the New York, and has 8 ft. more freeboard, better protection for the gun-stations, and twenty per cent. greater coal capacity. Her estimated coal capacity is about 6200 nautical miles, at a speed of 10 knots. Her engines are of 16,000 horse-power, and speed 20 knots. Protection at the water-line is afforded by a 3-in. armour-belt, extending the length of the engine and boiler-rooms, and from 4 ft. above to 4 ft. below the water-line. The protective deck extends from stem to stern, the edges amidships being 9 ft. 6 in. below the normal water-line, and rising to the level of the water-line amidships. Above the machinery, boilers, magazines, &c., this deck is 6 in. in thickness on the slopes, and 3 in. on the horizontal portion. The 8-in. guns are mounted in four barbette turrets, one forward and one aft, on the centre line, and one on each side amidships. The armour forming the barbettes is 8-in. thick for a portion equivalent to the train of the guns, and 4-in. thick for all remaining portions. The twelve 5-in. Q.-F. guns are protected by fixed shields 4-in. thick, and by 1½-in. splinter-proof bulkheads. The smaller guns—nineteen in number—are protected by shields and extra side-plating; there are five torpedo-tubes, one at the bow and two on each side. The cruiser is provided with two military masts, with fighting-tops, but carrying no sails. The arrangement of decks above water has been designed to provide good headroom and berthing accommodation. The complement will be 566 men, including officers. The Brooklyn will not be ready for her trials till the end of 1896.

Gun-vessels. The gun-vessels Wilmington, Nashville, and Helena, originally known as Nos. 7, 8, and 9, and also under the names of the Albatross, Penguin, and Porpoise, have been launched. The Nashville and Helena are sister-ships. Length, 250 ft.; beam, 39 ft. 6 in.;



"INDIANA,"

UNITED STATES BATTLESHIP.

mean draught, 9 ft.; displacement, 1392 tons; I.H.P., 1600; speed, 13 knots; armament, eight 4-in. guns, four 4-prs., two 1-prs., and two machine-guns. The Wilmington has the same armament, but is fitted with a torpedo-tube. Length, 220 ft.; beam, 39 ft.; mean draught, 11 ft.; displacement, 1371 tons; I.H.P., 1700; speed, 14 knots.

Gunboats.

Six composite gunboats are being built. They will be of two different types, two provided with full sail power and propelled by a single-screw, the others having steadying sails only and propelled by twin-screws. The principal dimensions of the single-screw type are:—Length on load water-line, 168 ft.; beam, 36 ft.; draught, 12 ft.; displacement, about 1000 tons; horse-power, 800; speed, 12 knots. The dimensions of the twin-screw type are the same except that the length is 174 ft. and the breadth 34 ft. The armaments of both types are identical, viz.:—Four 4-in., four 6-pr., and two 1-pr. guns. The normal coal supply of the single-screw boat will be 100 tons, with a total bunker capacity of 238 tons. For the twin-screw boats it will be 120 and 250 tons. The character of the service for which these gunboats are particularly designed requires that they should be protected from musketry fire. The major part of the battery is therefore to be housed by an unbroken deck, adding materially to the stiffness and strength of the vessels and giving excellent protection to the guns' crews.

The Holland Torpedo-boat Company, of New York, is building a submarine torpedo-boat; length, 80 ft.; diameter, 11 ft. Under the conditions guaranteed the boat is to give 19 knots when in a light condition, 14 knots when awash, using only steam power, 8 knots when completely submerged, with a minimum endurance of six hours at this speed.

Three torpedo-boats are building of 180 tons, 3200 horse-power, and 26 knots speed. Armament: three torpedo-tubes, and four 4-pr. Q.-F. guns.

Katahdin

The ram Katahdin failed to attain the contract speed. She will however, be accepted, subject to a considerable reduction on the contract price. With natural draught the speed was from 13 to 14 knots. On the occasion of the official trial at full power, the mean speed was 16·21 instead of 17 knots. In smooth water, without swell, the vessel behaved satisfactorily, steering perfectly and completing half a circumference in 17 seconds. The internal ventilation is excellent.

Indiana.

The battleship Indiana, 10,231 tons, built by Cramp, of Philadelphia, has been commissioned. The results of her four hours' trial were: mean I.H.P., 9545, which is 545 in excess of the contract power; number of revolutions, 128 and 120, speed, 15·5 knots, instead

of 15 knots. During the steering trials the ship turned in a circle of 400 yards diameter.

Columbia. A most interesting experiment was tried with the commerce-destroyer Columbia, which took part in the naval display at Kiel, and which was the subject of the most divergent criticisms. From the Baltic she proceeded to Southampton, where she went into dry dock to have her bottom cleaned. On the 26th July she again sailed, and, proceeding at full speed, reached Sandy Hook on the 2nd August, at 9·35 A.M. The passage had lasted 6 days, 23 hours, 49 minutes. The distance being 3109 miles, this was equal to an average speed of 18·41 knots. The days' runs were respectively 405, 460, 473, 458, 455, 453, and 403 miles. It had been arranged that the Columbia should make the passage with natural draught, except on the last day, when forced draught was to have been used ; but this final test was not applied, natural draught being used throughout. It may be added that the boilers showed signs of strain, and that some difficulty was experienced in keeping up the continuous supply of coal from the bunkers to the stokehold. The outcome of the experiment was that the Columbia was proved to be incapable of maintaining a speed approximate to that of the large Atlantic steamships. As a ship of war she has beaten the record, but inasmuch as the original idea had been that she should be capable of giving chase to mail-steamers, it cannot be said that she has proved a success. On her trials she had steamed 22·8 knots. Her ocean speed is therefore 4·4 knots less than that accorded to her in the naval handbooks.

Maine. The armoured cruiser Maine, 6682 tons, 9000 horse-power, was found, when all her stores were on board, not to be within the limits of the designed draught. According to the American newspapers, she was down by the head; and to rectify this defect eighty tons of ballast were introduced aft. She had, also, when at her normal draught, a list to port.

Texas. The Texas attained a speed of 17·82 knots on her trials, with 8900 horse-power, and an air pressure of 1·8 in. While in graving-dock it was found that the shape of the hull had undergone some change, attributed on the one hand to the weakness of the scantlings, and on the other to the too great space between the blocks on which the ship rested. The two causes combined probably produced the injuries referred to. Both the Maine and Texas, as well as the coast defence ship Amphitrite, have been commissioned.

A series of investigations on the subject of incombustible materials has been systematically carried on by the United States naval authorities. One of the best of these substances yet tried is compressed cork, exposed to a temperature of 204° Centigrade (463·32°

Fahr.). For the internal fittings, which still have to be made of wood, yellow-pine, into which sulphate and phosphate of ammonia have been injected by hydraulic pressure, has been adopted.

Numerous armour-piercing experiments have been tried at the polygon at Indian Head. New processes, based on the employment of electricity, have been made use of for the making of bolt-holes in Harvey steel plates. Various experiments with guns have also been tried. Some batteries of pneumatic dynamite guns have been mounted in sundry places.

A flying-squadron, commanded by Rear-Admiral Bunce, was formed at the end of last year and despatched to the West Indies. This squadron consisted of the armoured cruisers New York and Maine, the commerce-destroyer Columbia, and the protected cruisers Raleigh, Cincinnati, and Montgomery.

Argentine Republic.

Buenos Aires.

The protected cruiser Buenos Aires, launched the 10th May, 1895, is a valuable addition to the Argentine Navy. This vessel is of the type of fast cruiser to which the Elswick Works has paid so much attention. She has been built from the design of Mr. Philip Watts. Length between perpendiculars, 396 ft.; over all, 424 ft.; beam, 47 ft. 2 in.; mean draught, 18 ft. 3 in.; displacement, 4740 tons; coal supply, 1000 tons. The armoured deck is 1½ in. thick on the flat, and 3 in. on the slopes, but 5 in. thick over the machinery space. The conning-tower is protected by 6-in. armour. The machinery has been supplied by Messrs. Humphrys, Tennant & Co. It consists of two pairs of three-stage compound engines of the now universal inverted direct-acting type. There are four cranks to each set. The cylinders are high-pressure 40-in., intermediate cylinder 60 in., and two low-pressure cylinders, each 66 in. in diameter, the stroke being 36 in. Steam is supplied by four double-ended and four single-ended boilers of the usual return-tube type. The tube-ends were fitted with a screwed ferrule, designed by the contractors. The ship is sheathed with wood. There are two masts with fighting-tops. The armament is very powerful. Two 8-in. quick-firing guns, placed forward and aft on the centre line of the ship, are protected by armoured shields, which revolve with the guns. The majority of the other guns are mounted in an open central battery between the 8-in. guns, shut off from the ends of the ship by a thwart-ship screen. At each angle of the central battery is a 6-in. Q.-F. gun; two firing a-head and two astern; and between these, on each broad-

side, three 4·7 in. Q.-F. guns. The smaller guns consist of sixteen 6-pr. and eight 1-pr. Q.-F. guns. Four of the latter are mounted in the tops of the two military masts. There are five above-water torpedo-tubes, one at the stern, the other four on the broadside.

The following particulars of her trials are taken from the *Times*:—" The vessel had not worked up to her full speed when the trial commenced, the first two miles being made in 2 min. 47½ sec. and 2 min. 34 sec. respectively. This gives a mean speed of 22·435 knots, which, though considerably above the contract speed, was not so high as the designers anticipated. The remaining four runs were, however, made at higher speeds, the mean of these giving a speed of 22·975 knots. After the runs on the mile had been made, the Buenos Aires was headed south for the completion of the run. The revolutions gradually increased, and the ultimate result was a mean speed of 23·202 knots on the whole run, according to the recorded observations of the designers. Indicator diagrams were of course taken at intervals during the run, and from these it is estimated that the power exerted was 14,000 horse-power. The revolutions averaged 151 and 151½ per minute for the port and starboard engines respectively. The steam pressure averaged about 155 lb., and the vacuum 28 in. to 29 in. The trial, as stated, was with natural draught. It is now generally understood that natural draught does not mean that the stokehold doors are opened and the fans not used, as it is more convenient and comfortable to the stokers to run with closed hatches. In the Royal Navy a plenum of ½ in. on the water-gauge in the stokehold is considered natural draught. In the Buenos Aires the pressure did not exceed ·4 in. during the trial. With the 2-in. air-pressure, which constitutes forced draught, and with a corresponding increase of power, there is no doubt but 24 knots would be reached by the ship."

The Argentine Government, as we have elsewhere stated, purchased the armoured cruiser Garibaldi, built at the Ansaldo ship-yard, at Sestri-Ponente, for the Italian Navy. The Garibaldi was launched on June 27, 1895, and was ready for her trials on October 17—a quick piece of work with a ship of this size. Length, 328 ft.; beam, 59 ft. 2 in.; displacement, 6840 tons; 13,000 horse-power; speed, 20 knots. A 6-in. armoured belt encircles the whole of the water-line; above this belt a redoubt, covered with 6-in. plates, extends for two-thirds of the length, and protects the 6-in. guns. The upper part of the redoubt is covered with 1·9-in. plates. Finally, an armoured deck of from ¾ in. to 1¼ in. extends the whole length of the ship. Armament: two 9·8-in. guns, one forward and one aft, in barbette

towers, covered with 6 in. of nickel-steel; ten 6-in. guns in the armoured redoubt, separated one from the other by transverse screens; six 4·7-in. guns on the upper deck, behind shields; six 57-mm. guns, and several of small calibre. The Garibald has only one military mast.

Four destroyers of the Sokol type, of 240 tons displacement and 29 knots speed, have been ordered from Messrs. Yarrow.

Brazil.

The battleship Riachuelo, of 6000 tons, has been thoroughly repaired at La Seyne, near Toulon. She has been fitted with new boilers and her engines now develop 6900 horse-power with natural, and 7300 horse-power with forced draught. Alterations have been made in the armament. The 5·5-in. B.L.R. have been replaced by twelve 4·7-in. Armstrong Q.-F. guns, and several of smaller calibre, mounted on the upper deck and in the tops, have been added. She has been fitted with military masts.

The 24 de Maio, formerly the Aquídaban, is under repair at Stettin.

Several additional ships are under order for the Brazilian Navy. Negotiations have been opened with the Forges et Chantiers de la Méditerranée for the construction of two small battleships of 3500 tons and 14 knots speed, but just as they were about to be commenced, important modifications in the accepted designs were insisted upon by the Brazilian Government, thus causing delay. The new ships will have greater displacement and higher speed than was originally contemplated. The other ships building include three cruisers of 4000 tons, sheathed with wood and copper, and having armoured decks; speed, 19 knots with natural and 20 knots with forced draught; coal capacity, 10,000 miles at 10 knots. Also three torpedo cruisers of 1000 tons; speed, 20 knots with natural, 22 knots with forced draught. Coal capacity, 3000 miles at 10 knots. Armament, two 3·9-in. and six 1·9-in. guns, and three torpedo-tubes. Eight torpedo-boat destroyers of 26 knots speed—of the Gustav-Sampaio type—500 tons and 2500 horse-power; six torpedo-boats and two Goubet submarine-boats have likewise been ordered. One of the latter was completed in the month of August.

Chili.

One of the most powerful cruisers in the world is now building for the Chilian Navy at Messrs. Armstrong's yard at Elswick. She will **Esmeralda.**

be launched in April, and named the Esmeralda. The principal dimensions are : Length, 436 ft.; beam, 53 ft.; draught, 20 ft.; displacement, 7300 tons. A 6-in. belt, 6 ft. in depth, extends over four-fifths of her length. She carries shields on her guns, and has protection for the ammunition hoists. The armament, which is composed entirely of quick-firing guns, is extraordinarily powerful for a ship of this size, and the energy of fire that can be discharged per minute is greater than that in any ship afloat. It includes two 8-in., sixteen 6-in., eight 12-pr. and twelve 6-pr. Q.-F. guns, 4 Maxims and three torpedo-tubes.

Ministro Zenteno.

A smaller cruiser, the Ministro Zenteno, has been launched at Elswick. She displaces 3450 tons, and is 330 ft. 3 in. long, with 43 ft. 9 in. beam, and 16 ft. 10 in. draught. Her armament, wholly upon the quick-firing principle, consists of eight 6-in., ten 6-pr. and four 1-pr. guns, with three torpedo-tubes. The speed will be 20 knots.

Messrs. Laird Brothers, of Birkenhead, have launched the Capitan Orella, the first of four 30-knot torpedo-boat destroyers which they are constructing for the Chilian Government. The other boats are named Capitan Munoz Gamero, Teniente Serrano, and Guardia-Marina Riquelme. Length, 210 ft.; beam, 21 ft. 6 in.; I.H.P. 6000. The machinery is similar to that of the boats of the same class which Messrs. Laird are building for the British Government. The same firm have also in hand a torpedo gunboat to be called the Almirante Simpson, similar to the Almirante Lynch and Almirante Condell which sunk the Blanco Encalada in the Chilian civil war. Length, 240 ft.; beam, 27 ft. 6 in.; I.H.P. 4500; speed, 21 knots. The boilers will be of the Normand water-tube type. The armament comprises two 4·7-in. and four 3-pr. Q.-F. Armstrong guns, two machine guns, and three 18-inch torpedo tubes.

JAPAN.

New Programme.

The Japanese Government have drawn up an extensive programme of shipbuilding, which includes the following :—

Four battleships of the Majestic type. Length between perpendiculars, 390 ft. 6 in.; beam, 73 ft. 6 in.; draught, 27 ft. 2 in.; displacement, 15,140 tons; speed, 17·5 knots with forced and 16·9 knots with natural draught. Armament: four 12-in. guns mounted in pairs in two turrets, one forward and the other aft; twelve 6-in. and twenty-four 12-pr. Q.-F. guns; and five torpedo-tubes, four of which are submerged, while the fifth is in the stern. Protection: a 9-in. armoured belt at the water-line, terminating forward of the forward

turret and abaft the after turret in transverse bulkheads covered with 14 in. of Harvey steel. The large turrets will be protected by armour-plates of from 14 in. to 9 in. The armoured deck will have a maximum thickness of 5 in. Each of these ships will carry on deck two vedette boats. The coal supply will be 900 tons at normal draught, which can be increased by 300 to 400 tons. Three of these battleships will be ordered in Europe, the fourth will be built at Kuré.

Four first-class cruisers of the Edgar type. Length, 364 ft.; beam, 70 ft. 9 in.; draught, 23 ft. 7 in.; displacement, 7500 tons; speed, 21 knots with forced draught. The only protection will be an armoured deck of 5 in. maximum thickness. Armament, two 9·2-in. (26-ton) guns, ten 6-in. Q.-F. guns, and twelve 12-prs. The normal coal supply will be 850 tons, capable of being increased to 1000 tons.

Three second-class cruisers of the Yoshino type enlarged. Length, 378 ft. 6 in.; beam, 48 ft. 11 in.; draught, 17 ft. 8 in.; displacement, 4850 tons; speed, 22·5 knots with forced draught. Armament, four 6-in., eight 4·7-in. Q.-F. guns, and some smaller guns.

Two third-class cruisers, 3200 tons.

Three torpedo-cruisers. Length, 270 ft. 11 in.; beam, 29 ft. 9 in.; draught, 9 ft.; displacement, 1200 tons; speed, 21 knots. Armament, two 4·7-in. Q.-F. guns and four 12-prs.

A torpedo-depôt ship of the Vulcan type. Length, 344 ft. 7 in.; beam, 57 ft. 8 in.; draught, 22 ft.; displacement, 6750 tons; speed, 20 knots.

Eleven destroyers, 254 tons, 30 knots. Twenty-three first-class torpedo-boats, 120 tons, 24 knots. Thirty-one second-class torpedo-boats, 80 tons, 22 knots. Thirty-five third-class torpedo-boats, 54 tons. Six portable torpedo-boats, 11½ tons.

According to the scheme of the Japanese naval authorities, the following vessels will be ordered in Europe:—Three battleships, two first-class cruisers, one second-class cruiser, one torpedo-cruiser, one torpedo-depôt ship, four torpedo-destroyers, four first-class torpedo-boats, four second-class torpedo-boats, six portable torpedo-boats. The remainder will be built in Japan. The armour, engines, and large guns of all these vessels will, however, be ordered in Europe. It is only intended to proceed immediately with one battleship and a few cruisers.

The Chinese ships captured at Wei-Hai-Wei, still fit for service, have been repaired and added to the Japanese navy. One of them has since visited Shanghai, where her arrival attracted much attention.

The first-class battleship Yashima was launched at Elswick on **Yashima.**

February 28th, 1896. The Fuji,* of the same type, is building at the Thames Ironworks. We gave some description of these vessels in the *Naval Annual.* The following remarks from the *Engineer* may be quoted :—" She was commenced on December 6th, 1894, so that little over a year has been occupied in completing her for the launch, and it is expected that she will be completed for sea, with all armament on board, in about the same time. The dimensions and particulars of the vessel are as follows : Length between perpendiculars, 372 ft. ; breadth, extreme, 73 ft. 6 in. ; draught, mean, 26 ft. 3 in. ; displacement in tons, 12,300 ; I.H.P., forced draught, 14,000 ; I.H.P., natural draught, 10,000 ; speed, forced draught, estimated, 18¾ knots ; speed, natural draught, estimated, 17¼ knots ; coals carried at designed draught, 700 tons ; coals carried with bunkers full, 1200 tons. She is provided with a steel armour belt 8 ft. in width, carried from 3 ft. above to 5 ft. below the designed load water-line. This belt extends over a length of about 230 ft., and has a maximum thickness of 18 in., tapered to 14 in. at the extreme ends. The thwartship armour bulkheads which terminate the belt are 14 in. thick. Immediately above this belt there is a light belt of armour 4 in. thick, terminated by screen bulkheads extending from the sides of the vessel to the barbette armour. Behind this 4-in. armour coal bunkers are arranged, so as to afford additional protection against gun-fire. A protective deck 2½ in. thick is worked horizontally over the main belt and bulkhead armour, and under water decks of the same thickness give protection to the ends of the ship outside the limits of the armour. At the fore and aft ends of the belt, rising directly from the protective deck, are the two barbettes, formed of steel armour, 14 in. thick on the upper portions, reduced to 9 in. below. The main armament of the Yashima will consist of four 12-in. 49-ton guns, mounted in pairs in the barbettes previously referred to, and having also the protection afforded by 6-in. armoured gun-houses. The foremost pair train from direct ahead to 30° abaft the beam, and the aftermost pair through a similar arc. The auxiliary armament will consist of ten 6-in. 100-pr. Q.-F. guns. Four of these guns will be mounted on the main deck in armoured casemates 6 in. thick, and six on the upper deck in sponsons and protected by heavy shields. In addition there will he twenty-four 3-pr. guns, four mounted in the fighting tops, eight on the shelter decks, four on the bulwarks and on the main deck. There will be five fixed torpedo-tubes, one above water forward, and four submerged, two forward and two aft. All the armament is being constructed at Elswick. The Yashima will be propelled by twin-screw triple-expansion machinery, constructed by

* To be launched March 31st.

Messrs. Humphrys, Tennant, and Co., of Deptford. Steam will be generated in ten single-ended cylindrical boilers, with a working steam pressure of 155 lbs."

The third-class cruisers Suma and Akashi, have been launched in Japan. Length between perpendiculars, 306 ft. 9 in.; beam, 40 ft.: extreme draught, 16 ft. 4 in.; displacement, 2700 tons. The armoured deck varies in thickness from 1 to 2 inches. These vessels each have two vertical triple-expansion engines, and eight cylindrical boilers, tested to 24·2 lbs. They should develop 8500 horse-power with forced draught, and a corresponding speed of 20 knots. Coal supply, 200 tons, which can be increased to 600, which enables her to steam 12,000 miles at 10 knots. Armament, two 6-in. Q.-F. Armstrong guns on deck, one forward and the other aft, six 4·7-in. guns on sponsons, twelve 1·5-in. Hotchkiss, four Nordenfelts, and two torpedo-tubes. **Suma.**

The Chilian cruiser Esmeralda, at one time regarded as a very remarkable specimen of naval architecture, has been bought by Japan, and re-named the Izumi. Her displacement is 3000 tons, and her speed, 18·28 knots.

Torpedo-boat No. 16, of 114 feet and 52 tons, capsized in a very rough sea off the Pescadores while manœuvring. Only one man was saved. The cruiser Kuang-King, captured from the Chinese, was lost off the Pescadores on the 21st December. This was a ship of 1000 tons, 2400 horse-power, and 17 knots speed. **Ships lost.**

The executive list of the Japanese Navy includes three admirals of the fleet, 10 admirals, 20 vice-admirals, 30 rear-admirals, 208 captains, 304 commanders, 1150 lieutenants, and a sufficient proportion of sub-lieutenants.

China.

The torpedo-sloop Fei Ying, 850 tons, 4500 horse-power, launched at Stettin, completed her trials in July last, when she steamed 22 knots. She is fitted with eight Yarrow water-tube boilers. She is said to have been purchased by the Spanish Government.

It appears that the Chinese Government intends to reconstitute the navy, and to order several ships in Europe. The first instalment will, it is stated, include two battleships of 8000 tons, two armoured cruisers of 5000 tons, and four protected cruisers of 3000 tons. It may be predicted, however, that unless the Chinese improve their present system of recruiting and training, the fleet which they are now seeking to re-form will be exposed to the risk of a disaster similar to that of Wei-Hai-Wei.

The complete list of the Chinese losses during the war, which is given below, will be of interest.

Class.		Name.	Displacement.	How Lost.
b.	The Yalu Fleet.	Chen Yuen.	7400	Surrendered at Wei-Hai-Wei; repaired at Port Arthur. Taken to Japan.
b.		Ting Yuen.	7400	Sunk by Whitehead Torpedo during night attack by torpedo-boats at Wei-Hai-Wei.
a.c.		Lai Yuen.	2900	Sunk by Whitehead Torpedo during night attack by torpedo-boats at Wei-Hai-Wei.
a.c.		King Yuen.	2900	Sunk by gun-fire at Yalu.
cr.		Ching Yuen.	2310	Sunk by a shell from one of the mainland forts at Wei-Hai-Wei.
cr.		Chik Yuen.	2310	Sunk by gun-fire at Yalu.
cr.		Isi Yuen.	2300	Ran away at Yalu; surrendered at Wei-Hai-Wei; re-named Saiyen.
cr.		Chao Jung.	1350	Set on fire at Yalu; beached and burnt.
cr.		Yang Wei.	1350	Set on fire at Yalu; sank.
cr.		Kuang Chia.	1296	Wrecked on way to Port Arthur after Yalu.
Sloop.		Wei Yuen.	1260	Sunk by Whitehead Torpedo during night attack by torpedo boats at Wei-Hai-Wei.
		A large tug.	1260	Sunk by Whitehead Torpedo during night attack by torpedo boats at Wei-Hai-Wei.
c.d.s.		Ping Yuen.	2000	Surrendered at Wei-Hai-Wei; added to Japanese fleet.
Torp. Vessel.		Kuang Ping.	1000	Surrendered at Wei-Hai-Wei; added to Japanese fleet; re-named Kohei Yo.
"		Kuang Yi.	1000	Driven ashore and lost on 25th July, 1894, off Corea.

Also eight gunboats; two sloops; and one despatch vessel surrendered at Wei-Hai-Wei and added to Japanese Navy.

Hayti.

A third-class cruiser of 1000 tons, the Crete à Pierrot has been launched in England.

Saint Domingo.

For this small republic, Messrs. Napier, Shanks & Bell, of Glasgow, are building the twin-screw gunboat Restauration: speed, 14 knots; armament, nine small Q.-F. guns. The Independencia gunboat, 322 tons, armed with seven Q.-F. guns, has been completed and delivered.

CHAPTER III.

Relative Strength.

In previous years, when considering the strength of the British Navy relatively to those of other Powers, we have confined the comparison to the Navies of France and Russia, as being the only two countries with which we were likely to have serious difference. Recent events have shown that we might have to face other combinations, and it is well, therefore, that the Navies of certain other countries should be taken into consideration. The estimated expenditure for 1895–6 of the principal naval Powers is as follows:—

	£
British Empire	18,701,000
France	10,814,648
Russia	6,102,612
United States	5,073,365
Germany	4,318,125
Italy	3,713,509
Japan	1,127,974*

* 1894.

The relative strength of the various navies is, to a certain extent, indicated by their naval expenditure. No European Navy is of serious account which is not mentioned in the above list. In the Western Hemisphere it is apparent that the United States aims at occupying an important position amongst the naval Powers of the world. The sum voted for the Navy in 1896 is £5,866,802, a large increase on the sum given above. She has large arrears to make up, but her Navy already includes several fast cruisers, and there will be shortly added to its strength several powerful battleships, which are, however, only intended for operations in home waters. The South American Republics, Argentina, Brazil and Chili, possess some of the fastest cruisers in the world, but their Navies are in other respects insignificant. In the Eastern Hemisphere, the victory of the Japanese has thrown all the Chinese Fleet which was not destroyed in the war into their hands. The Japanese are already building two powerful battleships in England and have drawn up an extensive programme of shipbuilding, which includes four battleships of 15,000 tons. It is clear that with this new competitor in the field, we cannot hope to hold much longer the prominent position we have hitherto done in the waters of Eastern Asia.

Changes in 1895.

It will be convenient to follow the practice of former years, and to deal first with ships in commission. France is the only Power which keeps permanently in commission a naval force which can offer any

GREAT BRITAIN. **FEBRUARY, 1896.** FRANCE.

(From *Le Yacht*, of February 29th.)

	Great Britain: Mediterranean Fleet.	Great Britain: Channel Fleet.	Great Britain: Reserve Squadron.	France: Mediterranean Fleet.		France: Northern Squadron.
				Permanent Squadron	Reserve Squadron.	
Battleships	Anson Barfleur Camperdown Collingwood Hood Howe Nile Ramillies Rodney Trafalgar (10) Rupert (Gibraltar)	Empress of India Magnificent Majestic Repulse Resolution Royal Sovereign (6)	*Coast Guard*— Alexandra Benbow Dreadnought Colossus Edinburgh *Port Guard*— Devastation Inflexible Sans Pareil Thunderer *Tenders*— Conqueror Hero (11)	Baudin Courbet Dévastation Formidable Magenta Marceau Neptune Redoutable Brennus (9)	Duperré Caiman Terrible Trident (4) Achéron * (Toulon)	Hoche Bouvines Jemmapes Valmy Tréhouart (5) Flamme * (Dunkirk)
Cruisers, 1st-Class or Armoured	Hawke	Blenheim Blake	Australia Galatea Warspite	Chanzy Charner †	Cecille Tage (repairing)	Dupuy de Lôme
Cruisers, 2nd-Class	Arethusa Astræa Cambrian Forte Sybille	..	Melampus Mersey	Latouche Tréville † Suchet †	Sfax	Chasseloup-Laubat Friant
Cruisers, 3rd-Class	Barham Fearless Scout Surprise	Bellona	..	Cosmao, Faucon, Linois, Troude, Vautour, Wattignies,	Lalande Milan Condor (Tunis)	Epervier Coetlogon
Torpedo-Gunboats	Dryad, Gleaner Hebe, Skipjack Sandfly (Malta)	Halcyon Speedy	Leda, Niger, Onyx, Renard, Salamander, Sheldrake, Seagull, Sharpshooter, Spider	d'Iberville	Bombe, Flèche,	Lance Salve Sainte-Barbe (Granville)
Torpedo-Ram	Polyphemus	..	..	Leger, Lévrier ‡	Couleuvrine (Algeri	
Destroyers	1	6	9			
Seagoing Torpedo-Boats	3	..	..	6	2	3

* Armoured gunboats. † Training Squadron for officers.

‡ The Cassini and Casabianca on completion will be attached to Active Squadron; Leger and Lévrier to Reserve Squadron.

comparison to our own, and our attention will be to a great extent confined to the French Fleets. The main changes in the position since last year are, as regards the French, a slight increase in the Mediterranean Fleet, the substitution of modern ships for the antiquated and inefficient vessels which have of late comprised the Northern Squadron, and the reduction of the number of small and useless sloops and gunboats on foreign stations; as regards ourselves, the addition of two battleships to the Channel Fleet, and the commissioning of a small flying squadron, which has been referred to in the public press as a remarkable achievement. On the whole, it may be said that the relative strength of the naval forces of the two countries in commission in European waters is about the same as it was last year.

Abandonment of Mediterranean.

The ideas with regard to our position in the Mediterranean, which have been alluded to in former numbers of the *Naval Annual*, still prevail in certain quarters, though happily not amongst those who are responsible for the Naval Defence of the country. The immediate withdrawal of the Mediterranean Fleet to Gibraltar was again urged by a leader-writer in the *Morning Post* at the time when our relations with Germany were somewhat strained. In other words this writer recommended that the whole of our commerce in Mediterranean ports, which is nearly equal in value to that passing through the Suez Canal, and all our possessions in the Mediterranean, should be abandoned to any enemy possessing a fleet in those waters in time of war. The fatal objection to such a course of action from the strategical point of view is that it will require exactly twice the force to close up both egresses from the Mediterranean as it would to hold in check the French or any other fleet in those waters. It is strategically certain that if we have the general "command of the sea," we can command the Mediterranean, and that the abandonment of the Mediterranean will not help us to hold the command of the sea.

Mediterranean Squadrons.

The policy of abandoning the Mediterranean is based on a misconception of the strength of the Mediterranean Fleet and the power of reinforcing it in case of war. The British Fleet consists of the same ten first-class battleships as last year, viz., five Admirals, two Royal Sovereigns, the Nile and Trafalgar, and the Barfleur. The French Permanent Squadron consists of seven first-class and one second-class battleship, to which the Brennus will shortly be added. The French Reserve Squadron, which is only in full commission one month every year, consists of one first-class and three second-class battleships, two of the latter being classed by the French as coast-defenders. Two second-class cruisers have been added to the British Fleet. The cruisers Charner, Latouche-Tréville, and Suchet have been commissioned for the training-school for officers, but may fairly

be considered as belonging to the French Mediterranean Fleet. Even supposing that we should be suddenly plunged into war with France without any warning whatsoever, and at a time when the Channel Fleet was in England and the French Reserve Squadron was in commission, the British Mediterranean Fleet is in no danger. Its speed as a fleet is superior by two knots to that of the French combined squadrons, and by about one-and-a-half knots to that of the French Permanent Squadron. The Admiral in command possesses the power of either fighting or declining an action as he pleases.

Channel Fleet.

The Majestic and Magnificent were added to the Channel Fleet in December last, which now consists of six of the most powerful battleships afloat. The Blake has replaced the Endymion. It is probable that as the ships of the Majestic class are completed, they will be commissioned for the Channel Fleet, in place of ships of the Royal Sovereign class. The latter will then replace the Admirals in the Mediterranean Squadron.

French Northern Squadron.

The French Northern Squadron, which has been for some years past an almost negligable quantity, has been completely remodelled during the past year. The first-class battleship Hoche and the second-class battleships (or coast-defence ships, as they are styled by the French) Bouvines and Tréhouart, Jemmapes and Valmy, have taken the place of the Suffren, Furieux, Requin and Victorieuse. The armoured cruiser Dupuy-de-Lôme and another second-class cruiser have been added to the Squadron. The strengthening of this Squadron, and the fact that the five battleships which it includes have a maximum speed of about sixteen knots, makes a considerable change in the strategical position as compared with what it was a year ago.

Reserve Squadron.

The British Reserve Squadron has also been considerably strengthened. The second-class battleship Dreadnought has taken the place of the Aurora in the coastguard, and the first-class battleship Sans Pareil has taken the place of the Rupert (which has been sent to Gibraltar) as port guardship at Sheerness. Including the tenders Conqueror and Hero, the Reserve Squadron now consists of two first-class, seven second-class, and two third-class battleships. With two exceptions the maximum speed of these ships is about fourteen knots, which gives the French Northern Squadron as a fleet a superiority of two knots in speed. Under these circumstances it is doubtful whether we can say as we did last year, that the Reserve Squadron is fully capable of dealing with the French Northern Squadron, in spite of its great superiority in numbers. This is a point which needs especially to be borne in mind in drawing up a new programme of shipbuilding. It would be a great waste of power to have to use a Majestic to neutralise a Bouvines or Jemmapes.

A Flying Squadron was commissioned in January, including two first-class battleships, two first and two second-class cruisers, and six destroyers. The presence of this Squadron in home waters would afford the requisite number of ships of good speed to checkmate any operations which the French Northern Squadron might contemplate. **Flying Squadron.**

To sum up, we have in commission or partial commission in European waters eighteen first-class, seven second-class, and two third-class battleships. The French have ten of the first-class and eight of the second-class (including the Valmy and Jemmapes).

Germany had in commission during the summer months four first-class battleships of the Brandenburg class, four second-class battleships of the Sachsen class, and four coast-defence ships or fourth-class battleships of the Siegfried class (3500 tons). **Germany.**

Italy has three battleships in commission in the Active Squadron, viz., the Sardegna, Andrea Doria, and Morosini, and four in the Reserve Squadron, viz., the Re Umberto, Ruggiero di Lauria, Italia, and Lepanto. There are two cruisers and three torpedo-gunboats in the Active Squadron, and three cruisers and four torpedo-gunboats in the Reserve Squadron.* In February of each year the Active Squadron passes into the Reserve, and the Reserve Squadron becomes the Active Squadron. **Italy.**

The number of ships which Russia keeps in full commission all the year is necessarily very small. The Mediterranean Squadron is to consist of the battleship Navarin, the armoured gunboat Grosjastchy, and the sloop Zaporozets. The Rurik and Dimitri Donskoi have gone to China, while the Rynda Chernomorets and Rasborgnik return home. A special squadron, consisting of the armoured cruisers General Admiral and Duke of Edinburgh, is to be commissioned for service in the Atlantic. Most of the completed battleships of the Black Sea Fleet and of the Baltic Fleet will probably be commissioned as usual during the summer months. **Russia.**

From this general review we may conclude that the strength of our Fleets in European waters is amply sufficient to meet any reasonable contingency in the immediate future. It is doubtful whether it is necessary to keep the Flying Squadron as well as two extra battleships in the Channel Squadron in commission, except for the purpose of keeping the *personnel* of the Fleet efficient.

Turning to Reserves, it must be admitted that the strength of our Fleet Reserve has been considerably diminished, owing to the addition to our Fleets in commission. We have only four second-class, seven third-class battleships, and six coast-defence ships, available for sea at forty-eight hours' notice in the Fleet Reserve. All our modern first-

* Composition of the Squadrons on April 1st, 1896.

class cruisers are in commission, either in our squadrons or carrying reliefs. We have some fifteen second-class and five third-class cruisers of good speed in the Fleet Reserve. The French have, in the first and second categories of their Reserve, viz., available for sea at short notice, three second-class battleships, five coast-defence ships, four armoured cruisers, six armoured gunboats, etc.*

Distant Stations.

On more distant stations our squadrons are far superior to those of any European nation, except in China, where the Russians and French both maintain a considerable naval force. It is quite out of the question, in view of the growing naval strength of Japan and the United States, that we should maintain in peace time on the China and North American stations a force sufficient to secure us the command of the sea in those waters; though, as a matter of fact, we have an exceedingly powerful Fleet in China at the present moment, which is quite capable of dealing with the French and Russian Squadrons combined. It has already been mentioned that the French Admiralty, under the energetic pressure of Parliament, are reducing the number of the smaller and ineffective ships which they have hitherto maintained on foreign stations. The number of ships absolutely valueless for war purposes which we maintain in commission on foreign stations is very large. Very considerable economies might be made both in ships and men by substituting for the sloops and gunboats as they wear out a smaller number of second and third-class cruisers. It is not suggested that this can be done universally. For the long voyages in the Pacific sloops with some sail power are required, and in the Chinese and West African rivers small gunboats of comparatively light draught are necessary.

SHIPS IN COMMISSION.

ATLANTIC.

Class.	British.		French.
	Cape.	America.	
1st-Cl. Cruiser .	St. George	Crescent	
2nd-Cl. Cruiser .	..	Retribution	Dubourdieu
3rd-Cl. Cruisers .	Barrosa	Barracouta	Roland
	Blonde	Magicienne	
	Philomel	Pallas	
	Phœbe	Cordelia	
	Racoon	Mohawk	
	..	Tartar	
	..	Tourmaline	
Sloops and 1st-Cl. Gunboats . .	6	6	1
Coast-Defence Ship	*In reserve* (*Capetown*) Penelope		

* For list see p. 96. The Onondaga we do not include.

EAST INDIES.

Description of Ship.	English.	French.
2nd-Cl. Cruiser . . .	Bonaventure	
3rd-Cl. Cruisers . . .	Brisk Cossack Marathon	Primauguet* Dupetit Thouars
Sloops and Gunboats . .	3	4
Torpedo-Gunboats . .	2 (1 in reserve)	
Coast-Defence Ships . .	Magdala *In Reserve (Bombay)* Abyssinia	

* Will be relieved by Lapérouse.

CHINA.

Class.	English.	French.	Russian.
Battleship . .	Centurion		Nicolai I.
Armoured Cruisers	Immortalité Narcissus Undaunted	Bayard	Admiral Nachimoff Dimitri Donskoi Pamyat Azova Rurik
1st-Cl. Cruisers .	Edgar		
2nd-Cl. Cruisers .	Æolus Pique Rainbow Spartan	Alger Isly*	Admiral Korniloff
3rd-Cl. Cruisers .	Archer Porpoise	Forfait	
Sloops and 1st-Cl. Gunboats . .	8	1	7
Small Gunboats .	3	4 (2 in reserve)	
Despatch Vessel .	Alacrity		
Coast-Defence Ships. . .	Wivern (Hong Kong)	*In reserve (Cochin China)* Triomphante† Styx‡	Gremiastchy‡ Otvazny‡

* Ordered home. † Now classed as "Ponton Stationnaire."
‡ Armoured gunboats.

PACIFIC.

CLASS.	BRITISH.		FRENCH.
	AUSTRALIAN STATION.	PACIFIC STATION.	
ARMOURED CRUISER	Orlando		
1st-Cl. CRUISER .	..	Royal Arthur	
2nd-Cl. CRUISER .	..	..	Duguay-Trouin
3rd-Cl. CRUISERS .	Katoomba Ringarooma Wallaroo Pylades Rapid Royalist Tauranga } *In Reserve* Mildura } *(Sydney)*	Comus Satellite	Beautemps-Beaupré
SLOOPS and GUN-BOATS	3	3	1
TORPEDO-GUNBOATS	2 (1 in reserve)		

A very large proportion of our cruisers on foreign stations are modern ships of good speed and with deck protection. With the exception of the Alger and Isly, the French have no modern cruisers on foreign stations.

A mere comparison of ships in commission is not sufficient for forming a true idea of relative strength. The opposite table, which is an expansion of a table which has been given in the *Naval Annuals* of 1894 and 1895, gives in a concise form the effective fighting ships of our own and the principal foreign Navies.

Battle-ships.

The relative strength of Navies depends almost entirely on their relative strength in battleships; though the strength of a Navy such as that of Russia, which possesses practically no fast cruisers to act as the eyes of her fleets, must be considerably discounted on this account.

In first-class battleships our position is at the present moment satisfactory. We have a superiority of five ships over France and Russia combined, and a superiority of one ship even if we include Germany. The eight vessels of the Royal Sovereign class and the Majestic and Magnificent are certainly more powerful than any battleship as yet completed for any foreign Navy, with the possible exception of the Brennus.

Of second-class battleships we have only twelve, Russia and France combined have sixteen, and Germany has seven. The Jemmapes and Valmy are included with the coast-defence ships. The Bouvines and Tréhouart have a speed of nearly 17 knots, and are faster than any-

EFFECTIVE FIGHTING SHIPS, BUILT AND BUILDING.

Class.	England.			France.			Russia.			Italy.			Germany		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
BATTLESHIPS—															
1st-Class	21	8	29	10	8	18	5	6	11	8	2	10	4	1	5
2nd-Class	12	..	12	11	..	11	5	2	7	2	..	2	7	..	
3rd-Class	11	..	11	2	..	2	..	..	..	5	..	5	3	..	3
TOTAL BATTLESHIPS	44	8	52	23	8	31	10	8	18	15	2	17	14	1	15
COAST-DEFENCE SHIPS	13	..	13	16	..	16	10	4	14	..	..	..	17	2	19
CRUISERS—															
Armoured	16	..	16	9	1	10	9	1	10	1	4	5	..	1	1
1st-Class	11	6	17	2	4	6	2	..	..	..	..	..	1	..	1
2nd and 3rd-Class	51	15	66	10	9	19	3	1	4	16	1	17	3	4	7
LOOK-OUT SHIPS	19	..	19	12	..	12							11	1	12
TORPEDO-GUNBOATS	34	..	34	12	3	15	8	..	..	15	2	17	9	1	10

NOTE.—For details of above see Comparative Tables at end of Part II. Projected ships are not included, *e.g.*, Henri IV.

thing we have in this class. The Russians have two powerful ships of 16 knots speed on the stocks. Our position as regards second-class battleships is very bad; it has grown worse since last year, and will be even worse when the ships last named are completed. We have eleven third-class battleships, France two, Germany three, and Russia none. Our superiority in this class does not make up for our deficiency in second-class battleships, but still our ships are fit to "lie in the line" against a Redoutable, or a Preussen.

Coast Defence.

In coast-defence ships we are exceedingly weak, but not so weak as appears from the figures. Eight armoured gunboats are included amongst the French ships. Russia has seven old ships and three armoured gunboats. Three ships, viz., Kreml, Netron Menya, and Pervenetz, which are over thirty years old, have been excluded. Amongst the German ships are included eleven armoured gunboats. It must always be remembered that the power which aspires to the command of the sea must oppose battleships to the coast-defence ships of its enemies.

Battleships building.

In view of our superiority in battleships of the largest and most powerful type, we may, on the whole, rest satisfied with our present position. It is now necessary to turn our attention to the future. The following is a list of the battleships building:—

ENGLAND.

Laid Down.	Name.	Tonnage.
1895	Cæsar	14,900
1894	Hannibal	14,900
1895	Illustrious	14,900
1894	Jupiter	14,900
1894	Mars	14,900
1894	Prince George	14,900
1894	Victorious	14,900
1893	Renown	12,350
	8 Ships*	116,650

FRANCE.

Laid Down.	Name.	Tonnage.
1893	Bouvet	12,205
1891	Carnot	12,008
1891	Charles Martel	11,880
1894	Charlemagne	11,275
1896	Gaulois	11,275
1891	Jauréguiberry	11,824
1892	Masséna	11,924
1895	St. Louis	11,275
	8 Ships	93,666

* 5 Improved Renowns to be laid down in 1896.

RUSSIA.

Laid Down.	Name.	Tonnage.
1891	Three Saints	12,480
1892	Petropavlosk	10,960
1892	Poltawa	10,960
1892	Sevastopol	10,960
1895	Rostislav	8,880
1892	Sissoi Veliky	8,880
1895	Pervenetz	12,674
1895	Oslabya	12,674
	8 Ships	88,468

Germany has laid down one battleship of 11,000 tons, and Italy is building two ships of 9800 tons.

At the end of 1896 the position will be—

Future position.

		England.	France.	Russia.	Total France & Russia.
Battleships,	1st-Class	24	12	5	17
"	2nd-Class	12	11	5	16
"	3rd-Class	11	2	—	2

At the end of 1897—

		England.	France.	Russia.	Total France & Russia.
Battleships,	1st-Class	27	15	8	23
"	2nd-Class	12	11	6	17
"	3rd-Class	11	2?	—	2 ?

At the end of 1898—

		England.	France.	Russia.	Total France & Russia.
Battleships,	1st-Class	29	16	9	25
"	2nd-Class	12	11	7	18
"	3rd-Class	11	—	—	—

More battleships needed.

It appears from the foregoing summary that during the next three years we shall add to our Navy eight battleships of the first class, while the French and Russians should complete eleven first-class and two second-class battleships. It cannot be said that our present strength in battleships is more than sufficient to maintain the command of the sea. It is therefore clear that a new programme of battleship construction must be taken in hand during the next financial year and pushed forward rapidly during 1897-98 and 1898-99, as the ships of the Majestic class are completed. In the most modern and most powerful ships we have an overwhelming superiority, and there is no possibility of our losing our superiority in this respect before the close of the present century. At the end of 1898 we shall possess eight Royal Sovereigns, nine Majestics, and the Renown, or eighteen ships to oppose twelve French and Russian ships—a superiority of three to two, which may be pronounced sufficient in vessels of this type. When we turn to ships of older

design, whether included in the first or second class, we are in a position of marked inferiority, and by 1898 the position will be even worse.

Dimensions and numbers.

Our superiority in third-class battleships to a great extent compensates for the superiority of France and Russia in coast-defence ships, but can hardly be held to do so altogether. It should be noted that all the French and Russian second-class battleships are under 9000 tons. Nine are under 8000 tons. We are now in a position to form some conclusion as to the class of battleship which ought to be included in our next shipbuilding programme. These conclusions were embodied by the writer in a letter to the *Times* in November last :—" If it is contended that no ship ought to be built for the British Navy that is not capable of taking her place in the line of battle against the most modern foreign ships, we may have to accept a displacement of 12,000 tons.

" If, on the other hand, it is considered that a superiority of three to two is sufficient to deal with the first-class battleships now building for France and Russia, a displacement of about 10,500 tons may be accepted. For that displacement our naval constructors should be able to provide us with a ship capable of meeting a Sissoi Veliky on at least equal terms, superior in force to any second-class battleship or coast-defence ship which the French and Russians at present possess, and well able to take their part in an action against a fleet in which a Marceau or a Catherine II. is included.

" The experience of our last great naval war seems to show that numbers have more influence than individual size and power in deciding the fate of an action. This conclusion may not be universally admitted, but at any rate there is general agreement amongst all authorities on naval questions that numbers are of vital consequence in deciding the result of a war. Victory will rest with that Power which has a reserve of fresh ships to fall back upon after its principal fleets have been in collision with the enemy. If we continue to build ships of enormous dimensions, we must do so at a sacrifice in point of numbers. We have of late turned our attention to securing individual size and power. Let us in our new shipbuilding programme go in for numbers."

It is satisfactory to know that five battleships of under 13,000 tons are to be laid down in 1896, and that there is every prospect of the battleships now under construction being completed more rapidly than we have estimated.

T. A. Brassey.

CHAPTER IV.

The French Navy.

Since 1870 thirty-one Ministers have held the portfolio of Marine in France; the vitality of the Navy must have been indeed great to have survived such frequent changes. Those who have directed the administration during this period have passed away without leaving any durable impression. Some have initiated various reforms, but no one has been able to carry out the changes necessary to bring the administration up to the level of the requirements of the age. In spite of all, the fleet, thanks to the excellence of the *personnel*, has not suffered very much from the instability of power.

Central administration.

The Minister of Marine is almost always selected from the admirals or Members of Parliament, whether senators or deputies. His power is enormous. He is only responsible to the chambers. The President of the Republic contents himself with countersigning his decisions, and never opposes them. Parliament alone has the right of control, but exercises it only as far as the Estimates are concerned, and avoids interfering in matters of detail. The Minister has absolute freedom in the choice of his subordinates, the principal of whom is chief of the staff, and is always a flag-officer of the Navy. The chief of the staff is the right hand man of the head of the office, and controls the various departments.* His duties embrace, more especially, the ship-building programme, the commissioning and the movements of ships, the mobilisation and distribution of the naval forces of the country, and the study of foreign Navies and of coast defences throughout the world. He has directly under his orders a rear-admiral who directs the three military sections of the general staff. Moreover, as all business has to pass through his hands, he is nearly always head of the Minister's cabinet.

Distribution of business.

The business of the Ministry is distributed between four main branches: *personnel*, *matériel*, ordnance, and accounts.

The *Personnel* Branch is conducted by a naval officer. It administers all the corps of the Navy: officers of every kind, seamen,

* A scheme is under consideration for modifying the duties of the chief of the staff and reorganising the distribution of business.

troops of the Navy. It has charge of most of the schools, of martial-law, clothing, pay, allowances and hospitals. The *personnel* branch is divided into two sub-branches, and each of the latter into three sections.

Matériel Branch.

The *Matériel* Branch is under a naval constructor. It is, primarily, a technical department—shipbuilding, maintenance and repairs of ships, being its principal work. It has charge of hydraulic works, though the plans of these are prepared and the works are carried out by engineers of the Bridges and Roads department. Among its other functions are included the supervision of transport, and the general supply of the needs of the Navy. Finally, the head of the *matériel* branch is head of the technical office and of new construction, on whom devolves the difficult task of preparing and controlling the plans of ships. The *Matériel* Branch is divided into three sections.

Ordnance Branch.

The organisation of the Ordnance Branch is simple. It is only occupied with questions concerning guns and ammunition. It is directed by a General of Marine Artillery, and divided into two sections, the one charged with administration and works, the other with technical questions.

Accountant Branch.

The accountant branch controls the finances of the department. Generally it is presided over by a principal clerk; but at present the head of this important branch is an inspector of finance, lent to the Ministry of Marine by the Treasury. One of the most important duties is the preparation of the estimates, a very heavy task, considering that the forecast of expenditure has to be drawn up a year before the commencement of, and two years before the close of, the financial year with which it deals. Moreover, as the budget presented by Government is always revised by the Chamber of Deputies, the accountant-general is obliged to do the same work over again more than once. The branch has, in addition, to supervise the mercantile marine, fisheries, foreshore (*domanialité maritime*),* as well as all those miscellaneous services which could with difficulty be allocated to other departments. Six sections are under its orders.

Besides these four principal branches, there are in the Ministry of Marine two services, each of which take their orders from the chief of the staff. The first, the service of submarine defence, is directed by a post captain, and is concerned with all questions relating to torpedoes. The second, the hydrographical service, is under a rear-admiral, and has charge of the preparation of charts, of sailing directions, and scientific and nautical instruments.

To complete our survey of the central administration, the

* This is either let or lent gratuitously, but is never disposed of absolutely.

'Administration des Invalides' must be mentioned, which has amongst its duties to control all military pensions, and the pensions of the men of the 'Inscription Maritime,' certain matters relating to shipwrecks, assistance to sailors, etc. Finally, overlooking all the services, there is what is called a central board of control, which has the right of examining all questions entailing expense, and of seeing to the carrying out of the regulations. It must be added that the distribution of business amongst the different branches varies according to the ideas of the Minister.

Inscription Maritime.

It will be seen that besides its purely military attributes the Ministry of Marine has functions of a commercial character, which are due to the idea which prevails in France of the duty which the Navy has to perform towards the sailors of the mercantile marine. It follows them from the day of their entry in the ranks of the Inscription Maritime to the day of their death, gives them pensions, succours their families, never abandons them, whether they serve in merchant vessels, or take to the fishing industry. It extends its protection over them at every stage of life, and by this means has maintained the 'Inscription Maritime' intact, as the chief source of supply for the manning of the Navy.

Naval Boards.

Conseil Superieur.

Boards and Committees sit at the Ministry of Marine, amongst which the 'Conseil Superieur' holds the first place. Presided over by the Minister himself, it is composed of the two vice-admirals who command the Mediterranean and Northern Squadrons, the five vice-admirals who are maritime prefects, the chief of the staff, and the vice-admirals who have held both the post of commander-in-chief at sea, as well as that of prefect maritime or chief of the staff. At the present moment twelve vice-admirals out of fifteen are members of this Board. The Minister calls the Board together when he thinks it necessary, ordinarily once a year, and consults it on the programme of new construction, the changes to be introduced in naval *matériel*, and all questions concerning the maritime defence of the country.

The Committee of Inspectors-general comes next in order. Composed of three vice-admirals and a rear-admiral, it undertakes the duties of inspector, and gives its opinion on all matters which are submitted to it by the head of the department.

Works Board.

The Works Board (Conseil des Travaux), which has been for a long time all-powerful in questions of *matériel*, is composed of nineteen members. The executive branch is represented by two

vice-admirals, two rear-admirals and three post-captains; the corps of constructors by its inspector-general, a director of naval construction and two constructors; the marine artillery by two generals and a colonel; the land service artillery by a general; the department of Bridges and Roads by two engineers; the corps of naval engineers by the engineer-in-chief. The powers of the Board are very great. It works out the plans of new ships in accordance with the main lines determined by the Minister, and goes into and modifies the plans of the constructors. It at the same time supervises everything relating to ordnance and torpedo *matériel.* In principle its powers extend over all naval *matériel,* alterations or refits of ships, fittings of new ships, buildings ashore, armament of coast batteries, etc. The creation of the Technical Office has considerably reduced the duties of the Works Board. The composition of the latter has for a long time been the subject of the most severe criticism, and this because its action has not always been fortunate in its results. But it is hardly possible to expect of a number of prudent men the breadth of view and boldness necessary for the forefront of progress. Boards have often been, in the French Navy, the means of arresting progress, but have rarely taken the initiative in a step forward.

Promotion Committee.

There exist at the Ministry of Marine many permanent Committees, of which it suffices to mention the most important, viz.: the committee for the control and revision of the regulations for fitting out and for clothing; the contracts committee; the engines and machinery committee; the hydrographic committee; the superior board of health; the governing body of the "Invalides"; the prize board; the shipwreck committee; and the examining committee of accounts of naval works, etc.

A very important committee, called the committee for the classification of officers for promotion, meets every year at Paris. It draws up the list of officers of the rank of commander, lieutenant and sub-lieutenant, which it thinks deserving of promotion by selection. Its duties are divided between two sub-committees. The first is composed of all officers of flag-rank and post-captains who are heads of a naval division, and have just commanded-in-chief at sea, of the chief of the staff of the navy, and of the director of *personnel.* It draws up a list of names twice or three times, according to the rank, the number of the entries to be made in each rank. The second sub-committee, consisting of the vice-admirals who are inspectors-general, the chief of the staff, and the director of *personnel,* draws up the final list according to seniority in each rank.

Rear-admirals and vice-admirals are promoted by the Minister, without the intervention of any committee.

The Dockyards and other Naval Establishments.

The central administration drives the machine, the dockyards carry out its orders; but an excessive system of centralisation (the very opposite of what it ought to be) compels the departments at Paris to decide a number of questions of detail, the solution of which ought to rest with the dockyard staff. On the other hand, general questions, which it would be useful to concentrate in the same hands, are left to be decided at the different ports.

Dockyards.

France possesses five naval dockyards: Toulon, Brest, Cherbourg, Rochefort, and Lorient. Toulon is the most important; next come Brest and Cherbourg; Rochefort and Lorient are rivals for the humblest position. All are both building and fitting out yards, but practically only those ships which have been built or been extensively modified at Lorient and Rochefort are fitted out at these ports. Each of the five naval ports is the seat of a high command, which embraces a vast amount of coast, and at the head of which is placed a vice-admiral with the title of maritime prefect and commander-in-chief of a division of the coast; but this flag-officer is, at the same time, the actual director of the dockyard where he resides. His work is overwhelming, because in his hands is concentrated such a multiplicity of business, both of a naval and commercial character—the result of the position occupied by the Navy in France, and the diverse interests which it still directs. At Toulon, Brest and Cherbourg, the Vice-Admiral Prefet Maritime and Commander-in-Chief is assisted by a Rear-Admiral as chief of the staff; while a second Rear-Admiral, who bears the title of Major-Général de la Marine, is responsible for the *personnel* and ships of the Navy. The latter presides over the committees superintending in the trials of ships. A brigadier-general, belonging to the troops of the Navy, commands these troops in each of these five ports, but under the supreme control of the vice-admiral. At Lorient and Rochefort, the duties of the chief of the staff are performed by post-captains; but all the naval ports, in spite of the small importance of two of them, have practicaly the same establishments and staff—a fact which well exemplifies the general spirit of French administration. In each the administration, properly so-called, is directed by a principal clerk (Commissaire-Général); naval construction, by a director of naval construction; ordnance, by a colonel; sanitation, by a director; financial control, by an inspector-in-chief. In the three principal dockyards post-captains

have charge, one of the movement of ships in the basins and harbour, a second of the ships in reserve, a third of the depôt of the crews of the fleet, *i.e.*, of seamen on shore, a fourth of submarine defences. At Lorient and Rochefort these same duties are entrusted to commanders.

At Brest are situated the Naval College and the Boys' and Marine Apprentices' Schools, as well as the training school of second-class cadets. Lorient possesses the battalion of apprentices for the corps riflemen (fusiliers) who correspond with the marines of the British navy. Toulon is the centre of the gunnery and torpedo schools, and of the recently instituted higher training-school of the navy.

Administration of coast line.

As it has been already pointed out, the French coast is divided into five maritime divisions. These are further cut up into sub-divisions, at the head of which are placed administrators of the corps of clerks (Commissaires) corresponding in rank with that of post-captains. The question of replacing them with naval officers, which would appear to be a logical step and would certainly be done in time of war, has often been raised, but vested interests are respected in France without demur, even when they no longer satisfy the wants of the time. The stations of the sub-divisions are as follows:—

1st Division . .	Dunkerque and le Havre .	Headquarters, Cherbourg.
2nd Division . .	St. Servan	Headquarters, Brest.
3rd Division . .	Nantes	Headquarters, Lorient.
4th Division . .	Bordeaux	Headquarters, Rochefort.
5th Division . .	Marseilles	Headquarters, Toulon.

The Naval administration in Corsica is in the hands of a Post-Captain, who is the subordinate of the Prefet Maritime of Toulon. In Algeria and Tunis it is in the hands of a Rear-Admiral, who is under the orders of both the Governor-General of Algeria and the Resident-General of Tunis.

Manufacturing establishments.

Besides the five dockyards the French Navy has three manufacturing establishments: Ruelle, which is the foundry for coast-battery guns, and where the steel ordnance for service afloat, except the smaller calibres, is put together and completed; Indret, which is a steam-engine factory; and Guérigny, where chains, anchors, miscellaneous articles in steel and iron, and even thin plates are manufactured. The existence of Indret and Guérigny has been often threatened, but they have survived hitherto, and will perhaps survive for a long time yet, owing to the losses which their closing would entail, and the difficulties which would arise from the dispersion of the working population and the interests which have been created by these shops. Ruelle is managed by a colonel of marine artillery, Indret and Guérigny by a director of naval construction.

On the 1st January, 1895, the workmen engaged in various departments in the dockyards numbered 25,693, of whom 20,271 were employed in shipbuilding. Their average wages were 2*s.* 7*d.* per day. The workmen may be divided into two categories, the established employés, having a right to a pension after 25 years' service, and the supernumeraries, who are engaged or discharged according to the exigencies of the moment. In practice, however, it is found difficult to discharge workmen in considerable numbers, their parliamentary representatives bringing pressure to bear on the Government on their behalf. The Estimates include a not inconsiderable sum for the wages of a mass of moderately-paid functionaries of various kinds. In the various dockyards some 1500 watchmen, police, and firemen are employed, who increase the general expenses of the Navy. There is a tendency to effect a large reduction in the number of these men. The Budget Committees always wage war on them. **Dockyard Employés.**

The dockyards are no longer anything more than workshops for the fitting out and repair of ships of war. Not only the prepared materials, but also nearly the whole of the propelling machinery and engines of various kinds, which are so numerous in modern warships, being manufactured and supplied by private industry. It is true that an engine-building establishment is maintained for the Navy by the State, but its resources are unequal to the demand. In the same way the private yards share the work of shipbuilding with the naval dockyards, when the latter have had allotted to them as much as they can undertake. It may be added that torpedo-boats are invariably built by private contract.

The establishments which, as a rule, contract for building ships for the Navy, are three in number, viz.: the Forges et Chantiers de la Méditerranée, who have their principal establishment at La Seyne, near Toulon, and an important workshop and yard at Graville, near Havre; the Ateliers et Chantiers de la Loire, with building yards at St. Nazaire and Nantes, and workshops for machinery at St. Denis; and the Chantiers de la Gironde, established at Lormont, near Bordeaux. Armour plates are chiefly supplied by private contract, a certain quantity of deck-armour being produced at the Government establishment at Guérigny. In the matter of ordnance, the Navy is less dependent on private industry, which it employs only for the supply of the elements of steel guns, and prefers to finish off the guns itself to ordering them in the finished state from private firms. The carriages and mountings are also invariably constructed by private firms. **Private yards.**

The gunpowder used in the French Navy is specially manufactured

by the war department, which also supplies the small arms. In the case of the Whitehead torpedoes, a portion are purchased from Fiume, the remainder being manufactured at Toulon.

PERSONNEL—OFFICERS.

The personnel provided for in the estimates of 1896, including workmen at the dockyards, numbers 95,000 men.

Executive officers.

The officer *personnel* of the French Navy is so numerous that it is impossible in this short notice to give even the nomenclature of the different corps of which it is composed; the general title of officer has been given to a mass of functionaries and officials whose duties are quite subordinate and whose number is excessive. It will suffice here to deal with the different classes of officers who serve afloat. In the first place comes the corps of executive officers, also called *officiers de vaisseau*, to distinguish them from the other officers under the Department. These rank as follows :—

Vice-Admiral.
Rear-Admiral.
Post-Captain (*capitaine de vaisseau*).
Commander (*capitaine de frégate*).
Lieutenant, 1st class.
Lieutenant, 2nd class.
Sub-Lieutenant (*enseigne de vaisseau*).
Midshipman, 1st class (*aspirant*).
Midshipman, 2nd class.

Conditions of promotion.

The second-class midshipman is a boy who has passed two years at the Naval College, to which no one is admitted except by competitive examination. After leaving the college he is called second-class midshipman, and embarks for a year in a training ship, at the conclusion of which he becomes a first-class midshipman if he passes his examinations. The first-class midshipman must serve two years afloat before being promoted to the rank of sub-lieutenant. Entering the Naval College at the average age of 17 to 18, he becomes a sub-lieutenant at 22 to 23 years of age. Two-thirds are promoted to the rank of lieutenant by seniority, one-third by selection after at least two years' service afloat. The chief petty officers (*premiers maîtres*) of the Navy may be promoted to the rank of sub-lieutenant after an examination. In principle a third of the vacancies is reserved for them, but many of those who could aspire to the rank prefer to continue their career in their own special line, especially since their prospects have been improved.

In order to become a commander, a lieutenant must have served two years afloat and four years altogether in the rank. Half the

promotions are made by seniority, the other half by selection. Above the rank of commander all promotions are made by selection. To become a post-captain an officer must have three years' sea service as a commander, one year of which in command of a ship, or he must have served four years in the rank, two being afloat, and have held a command for two years since he was promoted from the rank of lieutenant. The conditions for promotion to the rank of rear-admiral are three years' service afloat in command of a ship or as chief of the staff of a squadron, or four years in the rank, two of which in command of a division of three ships. Rear-admirals, to become vice-admirals, must have commanded for two years at sea either an independent naval division or a division of a squadron. By a singular anomaly the numbers borne on the admirals' list are fixed by the regulations, but the numbers borne in other ranks can be varied from year to year by the Navy Estimates. At the present moment the numbers borne are as follows:—

15 Vice-Admirals.
30 Rear-Admirals.
115 Captains.
215 Commanders.
360 Lieutenants, 1st class.
360 Lieutenants, 2nd class.
520 Sub-Lieutenants.
172 Midshipmen, 1st class.
80 Midshipmen, 2nd class.

To the above must be added two commanders and twenty-four lieutenants in fixed appointments, who have given up their claims to promotion and are employed on shore.

New Regulations.

A new set of regulations, fixing the numbers borne in each rank and modifying the composition of the lists, as well as the conditions of promotion and retirement, has been submitted for the approval of Parliament, but has had to wait a long time its turn for discussion. Amongst other interesting modifications, the age for retirement is lowered for every rank, except for vice-admirals. At present the latter retire from active service at 65, rear-admirals at 62, captains at 60, commanders at 58, lieutenants at 55, and sub-lieutenants at 53. 1336 officers should, according to the estimates, be serving afloat in 1896.

Engineers.

Turning to the other corps of the Navy, we must first deal with the engineers of the fleet, who must not be confounded with the engineers of naval construction (naval constructors). The engineers are, afloat, the principal assistants of the executive officers. The corps comprises 301 officers, viz.: 1 inspector-general of machinery, who ranks as a flag-officer but after the rear-admirals; 6 inspectors

of machinery, who rank with captains; 18 engineers-in-chief, who rank with lieutenant commanders; 94 first-class engineers, who rank with lieutenants; and 182 second-class engineers, who rank with sub-lieutenants. The engineer-officers are all drawn from the petty officers' list (*maistrance*), and have passed through the lower ranks. Many of them, and those the best, are old pupils of the schools of 'Arts et Métiers.' Some have been at the boys' training school (*Ecole des Mousses*).

Naval constructors.

The officers of the corps of Naval constructors (Génie Maritime) number 145. They have charge of naval construction generally, and of the erection of propelling machinery. All are pupils of the Polytechnic school. The highest post is that of inspector-general, who ranks with a rear-admiral. He resides in Paris; but every year has to inspect the dockyards and other naval establishments. At the naval ports the constructors are placed under the orders of a director of naval construction, with the rank of flag-officer, and are divided into four sections: (1) Assistants to the director; (2) New construction and fitting out of new ships; (3) Repairs and refits; (4) Steam-engines. The French Navy is so organised that the corps of engineers has but little to do with the machinery of new shipbuilding, or with important repairs or replacing of engines. The responsibility for these rests with the naval constructor—a very defective system. The naval constructors rarely go afloat, seven only being told off for sea service. The remainder make short stays on board ships which are going through their trials. After leaving the Polytechnic school the young men who have chosen this career pass two years in Paris at the School of Naval Construction as constructor-students. They are then promoted to be assistant constructors of the third-class, a rank equivalent to that of sub-lieutenant. They rise pretty rapidly in the corps to the rank of first-class constructor, which is equivalent to that of captain. A few obtain the post of director, but there is only one inspector-general of naval construction. The Génie Maritime has furnished the most renowned constructors of the French Marine: Dupuy de Lome amongst others. All the constructors who are at the head of the great industrial establishments of France have served in the corps.

The medical service, afloat and ashore, is performed by 400 doctors, who are ranked as officers and are graded. Forty-three chemists, who also rank as officers, are attached to the hospitals, and carry out all the chemical analyses which affect the Navy.

Commissariat.

The supply services, afloat and ashore, are carried out by 368 officers of the commissariat, 100 of whom serve afloat. The commissariat department of the Navy has very extensive duties in

the dockyards. It administers accounts, stores, provisions, pay, etc. At the commercial ports, and in every centre of any maritime importance it keeps the lists of the crews of merchant ships, looks after the Inscription Maritime, etc. It has a mass of officials of all sorts under its orders. As a service it is admitted to possess great qualities; but it is reproached, not without reason, with having endowed French Naval administration with a very complicated system of responsibility, which locks up the services of a large number of employés.

Marine artillery.

The above are the corps which serve afloat, and which play the chief part in dockyard administration. Besides these it is proper to refer to the Marine Artillery, whose duties, at once colonial, maritime, and military, have no connection with one another. Thus the officers of the corps train and command troops who never serve on board a ship of war, of whom the minister for the colonies has the disposal in the French over-sea possessions, and the minister of war in case of mobilisation. In relation to the Navy, these officers have charge of the technical and other services connected with naval ordnance, and of the armament of certain batteries on the coast, and in the neighbourhood of the dockyards. They are also the managers of large workshops, and are represented in the dockyards by officers attached to the artillery administration. By a curious anomaly they serve on shore guns which are constructed by the minister of war, and themselves construct the guns which are manned by sailors and worked under naval officers. Finally, the officers of marine artillery are transferred from regimental and colonial duties, to technical duties, and in each sphere they are obliged to serve for a period in the colonies. Such an organisation is anti-scientific and unbusinesslike, and will disappear when the colonial army shall have been organised on a logical basis. The marine artillery will then become simply a corps of constructors of ordnance.

We need not speak of the 'Infanterie de Marine,' for the force is not employed on board ship. It is trained by the Navy for service in the colonies.

Hydraulic works.

The engineers of hydraulic works belong to the Roads and Bridges department, but are detached for service with the Navy. Amongst their duties are included the construction and maintenance of graving-docks, jetties, basins, and of all buildings and workshops in the dockyards. They are fifteen in number, and have fifty clerks of the works under their orders. The engineers are civilians. France also possesses a small corps of fifteen hydrographical engineers, who are generally employed at Paris at the charts' and plans' office. For the purpose of instructing the captains of merchant ships, seventeen

professors of hydrography are maintained, some of whom are attached to the Naval School.

Finally, there is a small corps employed at Paris and in the dockyards, that of Inspectors of Administration. It is composed of twenty-six officials, who correspond directly with the Minister, and whose principal duties are to supervise every act of administration and to see to the carrying out of the regulations.

Here we will stop, there is no feature of interest in the very secondary corps who serve in the dockyards, and whose strength is considerable.

SEAMEN.

Inscription Maritime.

The Inscription Maritime and voluntary enlistment furnish nearly the whole of the *personnel* of the Navy, but if these two sources of supply were insufficient the Army would be called upon to furnish to the Navy the number of men needed. The naval conscripts are about 135,000 in number, distributed as follows: coast fisheries, 71,000; deep-sea fisheries, 10,000; small boat fisheries, 10,000; coasting trade, 18,000; long voyages, 21,000; and the remainder in pilotage or yachts. They are entered at eighteen years of age and remain on the rolls to the age of fifty-five. At twenty they receive their orders to leave their homes, and are sent to one of the naval ports. Bound to a period of service of seven years, they may be retained in the first instance for five years by the naval authority. They are then sent on furlough, and for the remaining two years are kept in reserve. After the seven years have elapsed they can only be called upon to serve by a decree of the President. In reality the period of service in the fleet rarely exceeds forty-eight months; in 1895 it was forty-two months, and has been recently fixed at forty months. The Inscrits Maritimes have many advantages. They have a monopoly of the fisherman's and the sailor's professions, they pay for no licences, and they have a pension which puts them out of reach of want in their old age after 300 months' service afloat, whether on a man-of-war or on a merchant vessel. Their children are admitted to the school for the orphans of sailors, and to the Naval Boys' School (*Ecole des Mousses*). It is generally admitted that the Inscription Maritime could furnish in time of war a solid contingent of 40,000 men, omitting all non-effectives, but as this number of men would not find employment on board ship, it has for some time been demanded that they should be attached to the defence of the coast. A first step has already been taken in this direction.

Conscription also provides the Navy with some of its *personnel*,

more especially with the greater part of its engineers. The latter come forward, before they are called upon, to join the naval service, in which they have the advantage of being adequately paid.

Seamen's ratings and promotion.

The seamen are divided into three classes, according to the rate of their ordinary pay. They are also distributed in several special ratings which give them the chance of promotion, brevets, and additional pay, when they leave the schools where they have been through a period of instruction. The special ratings correspond with the exigencies of naval service: able seaman, gunner, rifleman, torpedo man, signalman, artificer, writer, only to mention those which are of interest. The men coming into the service are placed under observation at the naval depôts ashore. Some are distributed to the various training-schools, in accordance with the aptitudes they display, and as far as possible in accordance with their own individual taste; the remainder form the contingents of so-called deck sailors and are used for all kinds of work on board ship which does not require a special training. They have no future, and always remain third-class seamen. The Ecole des Mousses provides the Navy with a number of excellent men, who form the nursery of the petty-officer class, or, as it is called in the French Navy, "*la maistrance*." To whatever class he belongs the seaman can be promoted to the rank of petty officer (caporal); he then becomes second-class petty officer (sergeant), and first-class petty officer. In the latter rank he is on board the head of the *personnel* of the special branch to which he belongs. If he is specially able, he may be appointed chief petty officer (*maitre principal*) in a dockyard, which gives him officer's rank, but in this case he does not again go to sea.

Engineers.

The order of promotion in the corps of engineers offers certain peculiarities. To assure a sufficient supply of officers for the higher ranks the Navy admits young men, who have been through the Schools of 'Arts et Métiers,' as engineer students, and gives them at once an intermediate rank between that of quartermaster and that of second-class petty officer. These young men, whose training in the theory of their profession is sufficiently extensive, rapidly become second-class petty officers for the higher duties; whereas the engineers who have risen from the ranks become second-class petty officers for the practical work. All of them, moreover, receive special instruction in the engineer schools at Toulon and Brest. From second-class petty officers the best men rise to the rank of first-class and chief petty officers, and finally to that of chief engineers of the second class, which gives them the status of an officer corresponding with that of sub-lieutenant. The engineering branch is better paid than the other branches. There has been a long struggle to reach

the present state of things, which places the engineer officers on the same footing as the other secondary branches of the Navy. It will be noticed that all pass through the subordinate ranks. It may be expected that the requirements will continually increase, and in the future a college for engineer officers will be established which will be recruited from young men who have received a high scientific education. In this case the corps of naval constructors will cease to possess the preponderating influence which it has at present over the engineering branch.

The small special branches which play a part in the working of a ship have not been mentioned, but they are swamped amongst those of which we have just been speaking, and would take too long to describe. Some of those we have enumerated, it should be noted, have had their duties modified in accordance with the progress of the art of naval warfare. The able seaman, for example, is still the sailor who works the ship; but as ships with masts and sails become more and more rare, on modern ships he is told off to the small quick-firing guns. The rifleman, who corresponds with the marine of the British Navy, and who forms the backbone of the landing force, receives as complete a training in the handling of small guns as in that of the rifle. The engineer is electrician and torpedo man. The duties of the gunner have not changed; but the complications and the great variety of modern ordnance have increased the requirements for instruction. The signalman (*timonier*) remains what he has always been—the man who steers the ship, keeps the lookout, and attends to signals.

All the seamen specialists are competent men, thanks to the very costly system of training schools, which the French Navy has carried to a high degree of perfection. Under the guidance of executive officers, who are devoted to their profession, they form the *élite* of the crews. The training schools take them in hand when they have been selected for their special branches, after a preliminary stage in the naval depôts, and brings them to the end of their period of instruction by a system of training which is, at the same time, intelligent, and of a kind always suitable to the requirements of the various ships in which they are embarked. They afterwards perfect themselves in the practice of their profession, and more particularly in the special branches which they have adopted. Many rise in the service, become valuable auxiliaries to those in command, and make a career of the Navy.

Naval Matériel.

There is no necessity for pointing out here the very important part played by France in the development of naval *matériel*. Lord

Brassey did this in his address last year at Paris, at the opening of the summer session of Naval Architects. Neither is there any reason for giving a detailed description of the different types of ships in the French Navy, about which sufficient information has been given in the various numbers of the *Naval Annual* since its first publication. I shall content myself with attempting to pick out from the long list of the French Navy, all those ships which constitute its fighting strength; and I will then briefly mention those ships still existing which might render certain services. In this review I will deal first with completed ships; secondly, with ships now going through, or about to go through their trials; lastly, with ships still on the stocks, or completing afloat. I will commence with battleships, including amongst these the armour-clads displacing over 8000 tons; will pass on to the armoured coast-defence ships, and will then enumerate the armoured cruisers, protected cruisers, cruisers, torpedo-gunboats, and, under a special heading, torpedo-boats of various classes. I shall finally have to mention the gunboats and a few transports.

The list of completed ships includes the Amiral Baudin, 11,910 tons; Formidable, 12,165 tons; Amiral Duperré, 11,260 tons; Brennus, 11,395 tons; Hoche, 10,997 tons; Marceau, 10,850 tons; Neptune, 10,980 tons; Magenta, 10,850 tons; Devastation, 10,705 tons; Courbet, 10,810 tons; Redoutable, 9437 tons; Friedland, 8990 tons.* These 12 battleships make a group of unequal value; but all are armed with quick-firing guns. Their hulls are of iron and steel, and when united in one fleet they would have a sea-speed of about 14 knots—with the exception of the Friedland which is rather slower. The fastest ship is the Brennus; the Hoche, Marceau, Neptune, and Magenta, which can make 16 knots without forced draught, come next; the remaining ships, which are of older construction, are slower. Battleships.

Four armour-clads with wooden hulls are still found in the list, viz.: the Richelieu, Colbert, Trident, and Suffren. Their displacement ranges from 7800 to 9130 tons. One, the Trident, is in commission in the Reserve Mediterranean Squadron, but she will be replaced in the course of the current year, and as it is intended to reduce the cost of her maintenance to a minimum, it may be accepted that she, like the three others, will be struck off the lists in the not very distant future. Wooden battleships.

There are 15 coast-defence ships, viz.: Terrible, 7879 tons; Requin, 7820 tons; Caiman, 7640 tons; Indomptable, 7635 tons; Bouvines and Tréhouart, 6610 tons; Jemmapes and Valmy, 6590 tons; Furieux, 6020 tons; Fulminant and Tonnerre, 5860 tons; Coast-defence ships.

* These tonnages are the result of a recent revision, and have not been followed in the alphabetical list in Part II.—Ed.

Tonnant, 5090 tons; Tempête, 4870 tons; Vengeur, 4710 tons; Onondaga, 2593 tons. The first four belong to the same group, and have for a long time figured in the squadrons side by side with battleships proper. It is proposed to refit them, and to replace their 42-centimetre guns by weapons of smaller calibre. The Bouvines and Tréhouart have only just been commissioned; they are really small battleships rather than coast-defence ships. The Jemmapes and Valmy are sister ships; they are modified and improved Furieux. The Furieux, Fulminant, and Tonnerre are true coast-defence ships; they are sea-keeping to the same extent as other vessels of the class, and have fairly good speed. On the other hand, the Tempête, Vengeur, and Onondaga, are slow ships which would only be risked in exceptional circumstances at sea, but which would, nevertheless, be useful for coast defence. In France, as in other countries, the construction of armour-clads of moderate tonnage for the special duties of coast defence appears to have been abandoned.

Cuirassés de croisière.

The whole group of cruiser battleships is practically condemned. It includes six ships, viz.: the Bayard, Duguesclin, Turenne, Vauban, Triomphante, and Victorieuse. Their displacement ranges from 4670 to 6010 tons. The Bayard alone is in commission. The Triomphante is laid up at Saigon. All have wooden or composite hulls, and will be shortly struck off the list.

Armoured cruisers.

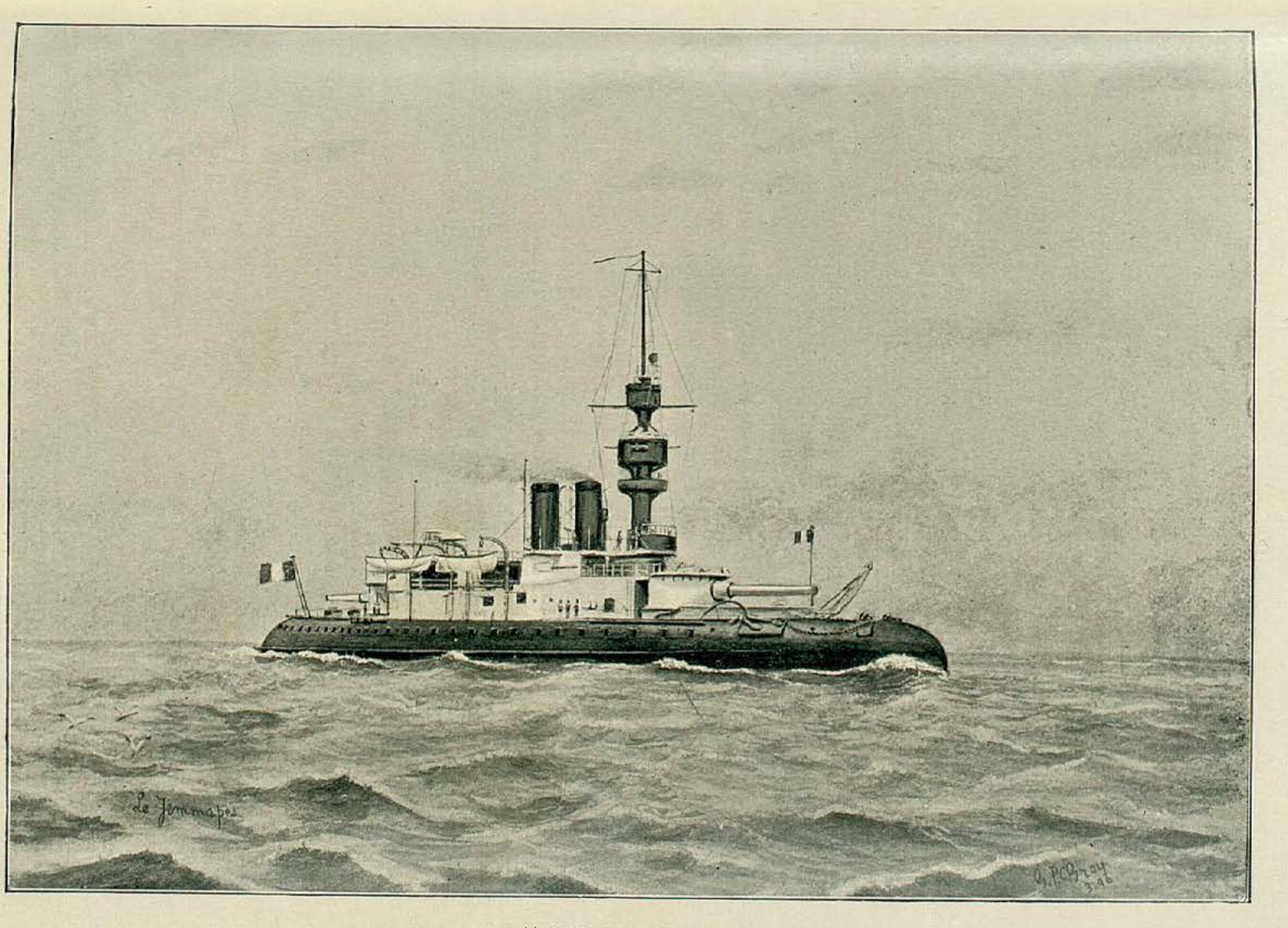
Five armoured cruisers are in commission, [viz.: the Dupuy de Lôme, 6406 tons; the Latouche-Tréville, Charner, and Chanzy 4750 tons. The Dupuy de Lôme has a completely armoured side; the others have only a belt at the water-line. The first named exceeded 20 knots on her trials, the others have steamed rather over 18 knots. The Latouche-Tréville is remarkable for the fact that her guns are all worked by electricity.

Armoured gunboats.

France possesses eight armoured gunboats, the water-lines of which are protected by armour, and which carry one gun of large calibre. They are, like other vessels of a similar type, very moderate sea-boats. They may be divided into two classes according to their tonnage. The first-class comprises the Achéron, Cocyte, Phlegéton, and Styx, of 1715 to 1795 tons; the second-class, the Flamme, Fusée, Grenade, and Mitraille, of 1090 to 1140 tons. The Styx is in reserve at Saigon. These vessels are of moderate speed, and would be utilised for coast defence.

The following is a summary of the available armoured fleet of France:—

12 Battleships.
15 Coast-Defence Ships.
4 Armoured Cruisers.
8 Armoured Gunboats.



"JEMMAPES,"

FRENCH COAST-DEFENCE SHIP.

To these must be added :—

4 Wooden Battleships.
6 Wooden cruising Battleships (*cuirassés de croisière*).
2 Wooden Coast-Defence Ships.

The fighting value of these 12 last ships is very doubtful. They will be struck off the lists in very few years' time.

1st and 2nd-class cruisers.

The French Navy List includes a large number of cruisers, among which are many wooden ships which might conveniently be eliminated. Taken in the order of tonnage the first and second-class cruisers of recent construction and available for service, are the Tage, 7589 tons; Duquesne, 6000 tons; Tourville, 5580 tons; Cecille, 5935 tons; Sfax, 4634 tons; Isly, 4475 tons; Alger, 4380 tons; Jean-Bart, 4109 tons; Chasseloup-Laubat, 3758 tons; Friant, 3740 tons; Duguay-Trouin, 3593 tons; Suchet, 3330 tons; Davout, 3020 tons; making a total of 13 vessels. Of these the Duquesne, the Tourville, and the Duguay-Trouin, built twenty years ago are composite vessels, with few watertight compartments, and therefore no longer fulfil the requirements of modern cruisers; but the first two had a trial speed of 17 knots, and have recently been thoroughly repaired. The others are of a later type, are armed with quick-firing guns, have armoured decks, and a speed of 17 to 20 knots.

The list of cruisers is completed by the four wooden vessels, Dubourdieu, Naiade, Aréthuse, and Iphigénie, stationed abroad or employed on special service.

3rd-class cruisers.

Of the 25 third-class cruisers still on the list, only 8 need be mentioned, viz.: the Linois, 2345 tons; Cosmao, Troude, and Lalande, 1920 tons; Coëtlogon and Surcouf, 1930 tons; Forbin, 1820 tons; and Milan, 1730 tons. The Milan might also be classed among the sloops. The radius of action of the seven first-named vessels — which are of modern type — is very limited. In foreign waters French cruisers of the third-class are still numerous; but they are wooden vessels which will gradually disappear from the Navy List.

Torpedo-cruisers.

There are 5 torpedo-cruisers, viz.: the Wattignies, 1310 tons; Condor, Faucon, and Vautour, 1240 tons; and Epervier, 1230 tons; all of the most recent type. They have a high speed, and will be useful as scouts and torpedo-boat destroyers.

Torpedo-gunboats.

The 12 vessels of the torpedo-gunboat class, include the Cassini, 944 tons; d'Iberville, 925 tons; Léger and Lévrier, 440 tons; Dragonne, 410 tons; Lance, 402 tons; Bombe, Couleuvrine and Dague, 395 tons; Fléche, 380 tons; St. Barbe and Salve 320 tons. The Cassini and d'Iberville are of the latest type, the Léger and Lévrier are of recent construction, while the remaining eight were built

some twelve years ago. All have a high speed, the Cassini and d'Iberville steaming more than 21 knots.

A summary of the vessels included under the heads of protected cruisers and large torpedo-boat destroyers will thus be seen to include:—

13 First and second-class Cruisers.
8 Third-class Cruisers.
5 Torpedo-Cruisers.
12 Torpedo-Gunboats.

These, with the armoured battleships already enumerated, constitute the French fighting fleet.

Ineffective ships.

The list of the French Navy contains, besides wooden battleships and cruisers, which it is unnecessary to dwell upon, a number of vessels serving on foreign stations or in the French colonies, which have no military value. In fact they may be regarded as part of the impedimenta of a colonial power. They include some 30 inferior wooden sloops, 13 transports, which are fitted with an armament, and can carry several hundred tons of cargo; and 14 gunboats, the majority being of composite construction. There are besides a certain number of transports requiring thorough repair to render them serviceable. One of these, La Gironde, is a fleet-transport which has several times taken part in the annual manœuvres. The others are used either as hospital-ships or cargo-boats. There is, however, an increasing tendency to make use of vessels of the merchant service for those services as transports formerly performed by the Navy itself. That each service should stick to its proper work is logical; but it must not be forgotten that these vessels formed an excellent school of navigation and of seamanship, both for officers and men. Finally, we may mention some twenty small vessels employed on the French coasts for the protection and regulation of the fisheries, duties devolving upon the Navy in connection with the *Inscription Maritime*.

Ships under construction.

The following is a summary of the list of ships in course of construction given on the next page:—

9 Battleships.
3 Armoured Cruisers.
1 First-class Cruiser
2 Commerce-Destroyers.
8 Second-class Cruisers.
1 Torpedo Depôt Ship.
2 Third-class Cruisers.
1 Torpedo-Cruiser.
3 Torpedo-Gunboats.
1 Torpedo Destroyer.
1 Gunboat.
1 Sloop.
1 Transport Sloop.
1 Submarine Boat.

LIST OF SHIPS UNDER CONSTRUCTION.

CLASS.	NAME.	Tonnage.	Speed.	Laid Down.	Launched.	Probable Completion.
Battleship . . .	Charles Martel . .	11,880	17·5	1891	1893	1896
" . . .	Carnot	12,008	17·5	1891	1894	1896 (end)
" . . .	Bouvet	12,205	17·5	1893	..	1897 (end)
" . . .	Charlemagne . .	11,275	18·0	1894	1895	1898 (end)
" . . .	S. Louis	11,275	18·0	1895	..	1899 (end)
" . . .	Gaulois	11,275	18·0	1895	..	1899
" . . .	Jauréguiberry . .	11,824	17·5	1891	1893	On trial.
" . . .	Masséna	11,924	17·5	1892	1895	1897 (end)
" . . .	Henri IV. . . .	(?)	..	1896	..	1900
Armoured Cruiser	Bruix	4,754	19·0	1891	1894	On trial.
" "	Pothuau	5,360	19·0	1893	1895	1896 (end)
" "	Jeanne d'Arc . .	11,270	23·0	1896	..	1899
1st-Class Cruiser .	d'Entrecasteaux .	8,114	19·0	1894	..	1897 (end)
Com'erceDestroyer	Guichen	8,277	23·0	1896	..	1899
" "	Chateau Renault .	8,018	23·0	1896	..	1899
2nd-Class Cruiser .	Pascal	3,988	19·0	1893	1895	1897
" " .	Bugeaud . . .	3,740	19·25	1892	1894	On trial.
" " .	Du Chayla . . .	3,952	19·25	1894	..	1897
" " .	Cassard	3,952	19·25	1894	..	1897
" " .	Descartes . . .	3,988	19·0	1892	1894	On trial.
" " .	Catinat	4,065	19·0	1894	..	1897
" " .	Protet	4,113	19·0	1896	..	1899
" " .	D'Assas	3,952	19·0	1894	..	1897
Torpedo Depôt Ship	Foudre	6,090	18·5	1892	1895	On trial.
3rd-Class Cruiser .	Galilée	2,317	20·0	1894	..	1896
" " .	Lavoisier . . .	2,317	20·0	1894	..	1897
Torpedo-Cruiser .	Fleurus	1,310	18·0	1891	1894	1896
Torpedo-Gunboat .	Casabianca . . .	960	21·5	1893	1895	On trial.
" " .	Dunois	896	23·0	1896	..	1898
" " .	La Hire	896	23·0	1896	..	1898
Destroyer . . .	M[1] . . .	375	26·0	1896	..	1898
Gunboat . . .	Surprise	629	13·0	1893	1895	On trial.
Sloop	Kersaint	1,243	15·0	1895	..	1898
Transport Sloop .	Vaucluse . . .	1,613	10·6	1895	..	1900
Submarine Boat .	Morse	146	13·0	1892	..	1896

The battleship included in the Estimates for 1896 will not be commenced until the end of the year. The number of torpedo-boats to be put in hand in 1896 is not fixed by the Estimates, and will depend upon the resources at the disposal of the Admiralty arising from delay in the completion of other work.

It is apparent from the number of vessels which will make their trials in 1896, that the ships to be commissioned in the course of the year, should include 2 battleships, 1 armoured, 2 second-class and 1 third-class cruiser, the torpedo depôt ship, 1 torpedo-cruiser, 1 torpedo-gunboat, 1 gunboat and 1 submarine boat.

In 1897, the vessels to be commissioned will include 2 battleships, 5 second-class cruisers and 1 third-class cruiser.

The steam trials of French ships always occupy a considerable time, owing to the care with which the machinery is tested, and especially so now, owing to the experiments being made with the new water-tube boilers in order to ascertain their strength and the way of using them to the best advantage. Nearly all the ships now building are fitted with water-tube boilers. They are armed with guns of high initial velocity, and very little wood is used in their construction or fittings.

Torpedo-boats.

The torpedo-flotilla includes the following classes: seagoing, first, second, and third-class torpedo-boats, vedette-boats, and submarine boats. The seagoing torpedo-boats, 33 in number, are of 106 to 150 tons. The Forban, 136 tons, built by M. Normand, has a trial speed of 31·029 knots, for a consumption of 2 tons 12 cwt. of coal per hour. Speeds of 25 to 26 knots, being at least 2 knots in excess of the contract speed, have been attained by the seagoing torpedo-boats of most recent construction. There are 65 first-class torpedo-boats, most of them of 80 tons. While the seagoing torpedo-boats are more especially intended for service with the fleet, the first-class torpedo-boats are to be used for local defence. In addition to these, there are 82 second-class torpedo-boats nearly all of 54 tons. No further vessels of this class have been built during the last few years. The list is completed by 40 third-class torpedo-boats and 6 vedette-boats, of obsolete types.

The torpedo-boats, both commissioned and in reserve, are for the most part stationed at the chief naval ports; but there are also small groups of such vessels at Dunkirk, in Corsica, Algeria, and Tunis. Six are held in reserve at Saigon. At the naval ports they are attached to a ship of larger tonnage. Those in commission put to sea frequently. The remainder are kept in good condition, and get up steam periodically to test the condition of their engines and boilers. The distribution of the boats is settled by the Minister of Marine. According to the Appendix to the Estimates, 2 first-class and 2 second-class torpedo-boats are to be stationed at Dunkirk, 4 of each class at Cherbourg, 2 of the first-class, 4 of the second, and 2 of the third-class at Brest, and so on. This arrangement is, however, subject to necessary variation. During the annual manœuvres a

certain number of boats are drawn from the reserve for a period of training, which lasts about one month. At each of the naval ports the submarine defence is under the control of a Captain. Another officer commands the torpedo-flotilla, and is subordinate to the first. At Dunkirk, a commander, who at the same time commands an armoured gunboat, is the commanding officer of the torpedo-flotilla. In Corsica and Algeria the torpedo-boats are under the direct control of the Captain and Rear-Admiral, who respectively command the naval forces in these waters.

There are at present under construction in France, 2 seagoing torpedo-boats, one of 120, the other of 129 tons, and both of 25 knots speed, and 6 first-class torpedo-boats, of 85 tons displacement, and 23½ knots speed. In addition, the last 6 of the 8 portable torpedo-boats, ordered for the torpedo depôt ship, La Foudre, should be completed this year. One of these, built by Messrs. Yarrow, attained a very high rate of speed on her trials. Unfortunately, however, the aluminium used on her construction rapidly deteriorated, and after a few months in the waters of Cherbourg harbour, became, so to speak, perished. The further use of this metal for the remaining boats has therefore been abandoned. It is thought possible that this failure may have been due to the fact that the metal used was not chemically pure. A new vessel of the Forban class, probably of smaller displacement, to be called the Cyclone, will shortly be commenced. All the French torpedo-boats at present being built, will be fitted with Du Temple or Normand multitubular boilers.

Submarine boats.

In conclusion, we must not omit to mention the submarine boats, Gymnote and Gustave-Zédé, recently completed; and the Morse, now in construction at Cherbourg. In each, the motive power will be electricity from batteries of accumulators.

The Fleet in Commission.

The ships in commission are divided between the home squadrons, the extra-European divisions, local stations, and special services. In addition, a certain number are employed for training and instruction, for the protection of fisheries, as transports, etc. The most important of these groups is the Active Mediterranean Squadron; then comes the Northern Squadron; and lastly, the Reserve Mediterranean Squadron. We will deal, first, with the vessels of the Mediterranean Squadrons, Active and Reserve.

Mediterranean Squadron.

The Active Mediterranean Squadron is under the command of a Vice-Admiral, who must have previously commanded the Reserve Squadron for one year. The chief of the staff is a Rear-Admiral

or Captain, who has under his orders four naval officers doing the duties of aides-de-camp, and also a fleet-engineer, a paymaster, a fleet-surgeon, and a chaplain. The four last named are directly responsible for the administration of the special departments to which they belong. The aides-de-camp hold themselves at the disposition of the Vice-Admiral in command. When at sea they keep watch, are responsible for the signals, and report to the Admiral and the chief of the staff, through the medium of midshipmen attached to the staff, every incident which takes place. They have nothing to do with the navigation of the flagship, to which they belong. This vessel is commanded by a Captain, called the Flag-Captain. The other officers are a commander, six lieutenants, five sub-lieutenants, four engineers, an assistant paymaster, a surgeon, and a certain number of midshipmen.

The Active Mediterranean Squadron consists, in theory, of 9 battleships, and 9 cruisers of various classes, besides 9 destroyers and torpedo-boats. These form three divisions: the first, commanded by the Vice-Admiral, as Commander-in-Chief; the two others by Rear-Admirals, who hold these subordinate appointments for two years.

For 1896 the Squadron will include the following vessels:—

BATTLESHIPS: Amiral Baudin, Brennus, Courbet, Devastation, Formidable, Magenta, Marceau, Neptune, and Redoutable.
ARMOURED CRUISERS: Bruix, Chanzy, Charner.
CRUISERS, 3rd Class; Cosmao, Linois, Troude.
TORPEDO-CRUISERS: Faucon, Vautour, Wattignies.
TORPEDO-GUNBOATS: Casabianca, Cassini, d'Iberville.
SEAGOING TORPEDO-BOATS: Ariel, Argonaute, Chevalier, Corsaire, Forban, and Mousquétaire.

The list of battleships may be regarded as final. The other vessels are subject to change, according to the general requirements of the naval service. For the manning of the Active Mediterranean Squadron, provision is made in the 1896 Estimates for 461 officers, and 8600 non-commissioned officers and seamen. The cost is estimated at £776,442. This Squadron is ready for active service throughout the year; its naval base being Toulon. In the winter it cruises off the coast of Provence, and is constantly under exercise. As a rule, a division, sometimes the entire squadron, is sent to the Levant at this time of year. In summer, the ports of Corsica, Tunis, and Algeria, are visited, and occasionally the coasts of Spain. The Squadron then returns to Toulon, preparatory to the annual manœuvres, which are followed by an inspection by the Commander-in-Chief, previous to the transfer of his command to the Vice-Admiral of the Reserve Squadron.

The latter has under his command a force of much less importance than that just described, which should consist, in 1896, of only 4 battleships, 4 cruisers, and 2 torpedo gunboats, viz. :— Reserve Mediterranean Squadron.

BATTLESHIPS : Amiral Duperré, Trident, Caïman, and Terrible.
CRUISERS, 2nd Class : Isly and Suchet.
,, 3rd Class : Forbin and Milan.
TORPEDO-GUNBOATS : Léger and Lévrier.
SEAGOING TORPEDO-BOATS : Dragon and Téméraire.

Several changes will probably take place during the year, the Trident, for instance, being paid off and replaced by a battleship or an armoured cruiser. The vessels composing the Squadron will only be fully manned at the period of the annual manœuvres. During the rest of the year they will have from one-half to two-thirds of their full complement. The base for the Reserve Squadron, as for the Active Squadron, is Toulon. In winter the ships cruise occasionally on the coast of Provence, and in summer in the western basin of the Mediterranean. At the time of the manœuvres the crews are completed to their full strength. The Squadron then forms part of the command of the Vice-Admiral of the Active Squadron, whereas, at other times it is only under his general orders. The *personnel* of the Reserve Squadron consists of 114 officers and 3148 non-commissioned officers and men. In the Estimates it figures for the sum of £273,700.

The Northern Squadron is under the command of a Vice-Admiral, whose staff is similar to that of the Permanent Mediterranean Squadron. It comprises two divisions, the first under the direct control of the Vice-Admiral, the second under that of a Rear-Admiral, and is subject to regulations framed on the same lines as those applied to the two Mediterranean Squadrons. During the six summer months the ships are fully manned, while during the remaining months the crews are reduced to a minimum. The Squadron may now be said to consist of the following :— Northern Squadron.

BATTLESHIPS : Hoche, Bouvines, Tréhouart.
COAST-DEFENCE SHIPS : Jemmapes and Valmy.
CRUISERS (Armoured) : Dupuy de Lome.
,, 2nd Class : Bugeaud, Chasseloup-Laubat, and Friant.
,, 3rd Class : Coetlogon.
TORPEDO-GUNBOATS : Cassini, Lance, and Salve.
SEAGOING TORPEDO-BOATS : Archer, Dauphin, and Lancier.

It will be seen that the first 5 vessels of the above list, forming what may be called the nucleus of the Squadron, have not the homogeneity of the group of ironclads of the active Mediterranean Squadron. The *personnel* of the entire Squadron will include 239 officers, and

3412 non-commissioned officers and seamen. For the year 1896 the sum apportioned to it in the Estimates is £350,354.

Ships in Reserve.

The three home Squadrons just described, and the torpedo-flotilla constitute the bulk of the force which would be at the disposal of the French Naval authorities immediately on the outbreak of hostilities. Next would come a certain number of ships of the reserve, which could be quickly fitted out and commissioned. Included in the second category of the reserve are the following ships:—

BATTLESHIP: Friedland.
CRUISING BATTLESHIPS: Duguesclin, Turenne, Vauban, Triomphante (at Saigon).
COAST-DEFENCE SHIPS: Requin, Indomptable, Fulminant, Furieux, Tonnerre, Tempête, Vengeur, Onondaga.
ARMOURED GUNBOATS: 6.
CRUISERS, 1st Class: Tage, Duquesne, Tourville, Jean-Bart.
,, 2nd Class: Davout.
,, 3rd Class: Lalande, Surcouf.
TORPEDO-CRUISER: Condor.
TORPEDO-GUNBOATS: 2.

The torpedo-boats of every class are in reserve; only a few are unavailable. The above ships have their commanders, several officers and the nucleus of a crew told off. Ships of old type have been omitted from the above list. As a matter of fact, those having a fighting value and of modern construction have their munitions on board, as well as their captains, some officers, and skeleton crews told off. On the receipt of the order to mobilise, they would be ready to go to sea in a few days.

Foreign Stations.

The French Navy maintains five foreign divisions, of which two are commanded by Rear-Admirals, and the remainder by captains. The Rear-Admirals have attached to their personal staff, a flag-captain, a lieutenant, and a sub-lieutenant. Each captain of a division commands his own ship, and has a lieutenant, called a divisional adjutant, as aide-de-camp. The five foreign divisions are those of the Atlantic, the Pacific, the extreme East, Cochin-China, and the Indian Ocean.

Atlantic.

The Atlantic Division, commanded by a Rear-Admiral, consists of 3 cruisers and a sloop, none of which are of the latest types. Its field of action includes the east coast of North and South America, the West Indies, and the West Coast of Africa, from the Cape of Good Hope to Morocco. One of its duties during the present year will be to take part in watching the Newfoundland fisheries, conjointly with 2 small vessels which will sail from France in the spring.

Pacific.

The Pacific Division, commanded by a Captain, has for its sphere the Islands of the Pacific, and the western coasts of the two Americas.

It consists of 2 cruisers and a transport-sloop, not of recent construction.

The extreme East Division, commanded by a Rear-Admiral, operates in Chinese and Japanese waters, and comprises an armoured-cruiser, the Bayard; 2 second-class fast cruisers, the Alger and Isly; 1 third-class cruiser, 1 sloop, and 2 gunboats. Omitting the Bayard, which is of moderate value, the only vessels of modern type are the Alger and the Isly. One of these vessels will probably be recalled shortly. **China.**

The Cochin-China Division is under the command of a Captain, who has a residence at Saigon, and directs the Naval Arsenal at that place. Its duties include the guarding of the rivers of Cochin-China and the Mekong. We owe the exploration of the great Indo-Chinese river to the officers of this division. They ascended rapids previously considered impracticable in the small river gunboats. One sloop, 2 gunboats, and several river gunboats, form the nucleus of this Division. These vessels cruise on the coasts of Cochin-China and in the Gulf of Siam. One is stationed at Bangkok. Six torpedo-boats, an old disarmed ironclad, an armoured gunboat in reserve, and several sea and river gunboats are held in readiness at Saigon. **Cochin-China.**

The Indian Ocean Division, commanded by a Captain, consists of 2 third-class cruisers, 2 sloops, and 2 gunboats. It always remains in Madagascar waters, where it was reinforced by several small vessels during the recent war. About a dozen stern-wheel gunboats, of light draught, employed on the Betsiboka, and having no military value, are also attached to this division. **Indian Ocean.**

The vessels attached to colonial stations are of less importance than those forming part of the Naval Divisions. They are as a rule sloops of small tonnage, under the orders of the Governors of the Colonies, and performing local service. The French Admiralty, in conjunction with the Minister for the Colonies, is taking steps towards the gradual diminution of the number of these vessels. Five are employed on the West Coast of Africa, 2 at the Society Islands, 1 at Guiana, and 1 at New Caledonia. Five river gunboats and a sloop are stationed at Tonquin. It is, however, unnecessary to refer more particularly to these small vessels, which may be regarded as the rubbish of the Navy. They are simply a source of expense, while offering few advantages in the way of training to their crews. **Colonial stations.**

On an examination of the manner in which the naval strength of France is divided, it is evident that the most powerful ships are attached to the home Squadrons, and that an important and well-organised reserve of armoured coast-defence vessels, cruisers, torpedo-

destroyers, and torpedo-boats, exists, and could be readily prepared for active service, thanks in great measure to the resource which France possesses in the Inscription Maritime. The extra European divisions are composed of ships of moderate power, with one or two exceptions, built of wood. The protection of the fisheries in Newfoundland and Iceland is also carried out by vessels of an obsolete type. At the present time several swift vessels of composite construction are building for service with the Naval Divisions. It would appear, however, that the French Parliament is disinclined to vote money for ships for foreign waters. It has refused to do so for the current year, whereas the credits required for the home fleets have been granted.

It will be seen, on looking through the foregoing pages, that France maintains 123 ships in commission, including those attached to the European Squadrons, the Naval Divisions, and local stations, or used for particular service, as gunboats, despatch-boats, transports, school-ships, etc., the whole force forming one of the main sources of expense of the French Navy.

Schools of Instruction.

School for officers.

A large number of schools of instruction are maintained by the French Navy, some on sea-going vessels, others on stationary ships or ashores. The Higher School (*Ecole supérieure*), which has just been formed, is under the control of a Rear-Admiral, and comprises 3 fast vessels, the armoured cruisers Latouche-Tréville and Charner, and the second-class cruiser Suchet. To this school are admitted some twenty lieutenants, candidates for promotion to higher rank. The course of instruction, which lasts for one year, includes naval tactics, the science of naval warfare, naval architecture, gunnery, and torpedoes. The officer-students carry out all manœuvres at sea and in harbour, under the supervision of the officers in command of the several ships. At the termination of the course the students, after having passed all examinations, receive staff-appointments in the Squadron or at the chief naval ports.

The next educational establishment is that established at Brest, on board the Borda, to which pupils are admitted, after competitive examination, between the ages of fifteen and eighteen The course of instruction, lasts two years, and includes mathematics, astronomy, naval architecture and its applications, mechanics, steam, English, seamanship, ballistics, gunnery, torpedoes, etc.; in a word, all the subjects necessary to a naval officer. The students are exercised in practical work of various kinds. On entering the school they possess sufficient

knowledge of science and literature, so that their training on board the Borda has not to be interrupted by taking up elementary subjects. Instruction is given by both naval officers and civilian professors. On the completion of their course those who pass the required examination become second-class midshipmen, and have to serve for one year on board a sea-going school ship in the Atlantic and Mediterranean.

The school for gunners and signalmen is established on board an old ironclad, the Couronne, to which is attached a ship fitted for big-gun practice. The course lasts eight months. The officers, after passing a satisfactory examination, receive brevet rank. The torpedo-school is conducted in the same manner on a sea-going ship, and trains both officers and seamen. For the school of pilotage a sloop is used, which cruises on the French coasts of the North Sea, the Channel, and the Atlantic. The school of musketry is established at Lorient. **Gunnery school.**

Boys for the Navy are trained at Brest on a hulk, to which are attached sailing brigs, for exercise in seamanship.

Schools for mechanical engineers are established at Brest and Toulon. The school of naval architecture and engineering is at Paris, the course being two years; that of medicine and surgery at Bordeaux, with branches at Brest, Rochefort, and Toulon, where students receive elementary instruction before being admitted by competition to the establishment at Bordeaux. There are other schools of instruction—less interesting than those enumerated, but not less useful in their way—connected with the Navy.

A sum of about £520,000 is devoted annually to the purposes of naval education and training in France.

The Estimates.

In 1890 the sums voted for the Navy amounted to £7,996,147; in 1896 they amount to £10,635,114, which is considerably less than the total for either of the preceding two years. In thus reducing expenditure Parliament has been actuated by financial considerations. The Report of the Budget Committee was nevertheless careful to point out that the sum authorised for naval expenditure of France, when compared with similar expenditure in other countries, exceeded by some £800,000 that which the Powers forming the Triple Alliance devote to their Navies.

The French financial year extends from the 1st January to the 31st December. An estimate of requirements is submitted by the Government early in the spring preceding the year to which they

relate, and is examined by a special committee, which of late years has acquired the habit of materially modifying the propositions of the Admiralty. As the estimates are, as a rule, voted during the month of December, the programme of action has consequently to be entirely remodelled at the last moment. This system is obviously defective. Thus, for the year 1895, the Admiralty had drawn up a programme for shipbuilding which was rejected by the committee. A change of government took place in the interval, and it was not until the 16th of December that the matter was finally settled. There remained, therefore, only a few days in which to readjust the estimates for 1896.

The expenditure on the Navy is divided into fifty-seven heads, necessitating a correspondingly large number of entries and accounts. The impression prevails in France that this method is a guarantee of accurate account-keeping, but this is probably not the case. The appendices to the estimates convey valuable information as to the expenditure under the different heads, but as they are framed one year before the estimates come into force, and more than two years before the closing of the accounts, the details are as a rule incorrect, besides which the Admiralty is not bound by them.

Among these items of expenditure there are several not directly connected with the Navy, such as those relating to the marine troops, who, we may again point out, are never employed on board ships of war. It is possible that in the course of the current year the provision for these will be handed over to the war department, when they will form part of the colonial army. The Navy Estimates will thereby be relieved to the extent of some £800,000 at least.

For 1896, the following sums had been apportioned in the Estimates to various services, but as sundry modifications have since been recommended by the committee, of which it is difficult at present to determine the exact effect as regards the auxiliary *personnel*, we propose merely to give in round figures the principal items authorised :—

	£
For the equipment and maintenance of ships, manned by 21,000 seamen and 980 officers	1,920,000
Mobile defence of ports, in which 2000 men and officers will be employed	300,000
Colonial stations, 1000 men	80,000*
Trials of ships	100,000
Ships in reserve	520,000
Maintenance of ships not in commission	280,000
Fixed defences of Naval ports	200,000
Troops of the marine	840,000
Improvement of ports and roadsteads	360,000
Shipbuilding	3,106,060†
Schools, in which item reductions have been effected . . .	500,000
Inscription Maritime and fisheries	140,000

* This item will be reduced in future. † Actual sum.

Present condition of Navy.

The few preceding pages will convey a general idea of the organisation of the French Navy, the *personnel* and *matériel* of which are superior to the administration. As to the ships, it may be said that they possess the qualities and defects inherent at the period of their conception. Some of them, such as the Dupuy de Lôme, show that the designer clearly understood the conditions and requirements of modern warfare. It has, however, been impossible to derive full advantage from the professional skill and knowledge of the eminent naval architects and officers having control of the chief departments, owing to the frequent changes of government and the consequent changes in the administration which have taken place. The result is that the condition of the fleet is not in practice quite on a level with the progress which has been made in theory. Nevertheless, the ships are well armed and equipped, and are manned by skilled and experienced officers and well trained crews. To be in a state of preparation for war is the object which all concerned have in view.

It is not possible to speak in equally high terms of the administration, which is complicated, wasteful, and infected with the spirit of red-tapeism, the result being the employment of a crowd of persons engaged in unprofitable and useless work. With regard to the dockyards, France has a passion for uniformity, and has accordingly equipped and arrayed all these establishments on the same footing, according to fixed rule, without considering the services expected of them. The numerous workmen have a good deal of professional skill, but for the same cost they produce less than the British dockyard employé. They show too great a disposition to regard themselves as public functionaries.

A powerful Minister, thoroughly familiar with the requirements of the service, could alone initiate and apply the necessary reforms; but of those who have been at the head of the French Admiralty during the last twenty-five years, not one has had the time to take action. Under these circumstances it is scarcely surprising that proposals for administrative reform have been without result. Notwithstanding these drawbacks, however, France has been able to maintain a Navy which, though not beyond criticism, holds the second place among the Navies of the world.

CHAPTER V.

The Italian Navy.

The Navy of Italy has grown so much since 1870, and especially between 1880 and 1890, that it has become one of the principal factors in preserving the equilibrium of European politics. In the waters of the Mediterranean, at any rate, it surpasses all others in point of numbers and certain other elements of naval strength. Among the latter we give a very high place to the number, dimensions, and strategical location of dry-docks. Italy is now better provided than any other Mediterranean Power with dry-dock accommodation along her three seaboards. Another remarkable element of Italian sea-power is its intended limitation to a land-locked sea, and the impregnability of her fortified dockyards, situated at Spezia, Taranto, and Venice. Naples and Castellamare are the only yards still unfortified. Last but not least, the two *places d'armes* of Maddalena and Messina, which are kept in very good order, give additional strength to Italy's position in the Mediterranean. The former is provided with extensive workshops, the latter with a fine dry-dock.

Classification of ships.

Setting aside for a moment the official classification of ships, which answers only to administrative requirements, and which we shall give at its proper place, the Italian fleet may be divided into the following groups, according to the strategical and tactical value of the ships.

Ships ready for service.

1st. Six strategical battleships displacing from 11,000 to 14,000 tons. Their speed ranges from 17 knots in the Andrea Doria, Francesco Morosini, Ruggiero di Lauria, to 18·5 knots for the Re Umberto, 19 knots for the Sicilia, and 20 knots for the Sardegna. All these ships are powerfully armed, and sufficiently protected by partial steel armour, fit to stand the hardest test in modern naval warfare. The first three ships named above have a range of action of about 6000 nautical miles at 10 knots speed. The other ships can steam 4500 miles at the same rate.

2nd. Two large protected cruisers, the Italia and Lepanto, displacing 15,000 tons, having a speed of 17·5 to 18·2 knots. Both are heavily armed. Protection is afforded by an armoured deck and

a considerable extent of vertical armour. The range of these two cruisers is 8000 nautical miles at 10 knots speed.

3rd. Two tactical * coast-defence ships, the Duilio and Dandolo. These two ironclads, having a maximum speed of 15 knots and a range of 3000 nautical miles, cannot be considered any longer as strategical units. They still possess a tactical value that will be increased by the substitution of breech-loading guns for muzzle-loaders. At present the Dandolo is undergoing a thorough refit at Spezia, which includes the provision of new boilers and a new armament.

4th. Five antiquated ironclads, Maria Pia, Castelfidardo, Ancona, San Martino, and Affondatore, indifferently protected, sufficiently armed, and to be used only as a reserve.

5th. Six torpedo cruisers, Marco Polo, Etna, Fieramosca, Giovanni Bausan, Stromboli, Vesuvio, which have an average displacement of 3500 tons. Their speed is 17 knots, their coal endurance is about 5000 nautical miles. They have a heavy armament, but very scant protection is afforded by an armoured deck below the water-line.

6th. Eight strategical* cruisers, Calabria, Dogali, Elba, Etruria, Liguria, Lombardia, Piemonte, Umbria. The displacement of this class varies from 2200 tons in the Dogali to a maximum of 2500 tons. The average speed of the several units is 18 knots, with the exception of the Piemonte, which steams 22 knots. The range of the whole class is 10,000 knots.

7th. Thirteen tactical* cruisers, Aretusa, Calatafimi, Caprera, Confienza, Euridice, Goito, Iride, Minerva, Montebello, Monzambano, Partenope, Tripoli, Urania. The ships belonging to this class displace between 700 and 800 tons, and have a speed of 17 to 21 knots with a range of 3000 miles. The whole class is lightly armed and scantily protected.

8th. Twenty-four unarmoured ships of different sizes and types, disqualified for modern warfare, but still answering to the purpose as training ships and as political vessels for home and foreign stations.

9th. Nine unarmoured obsolete vessels, transports, troopships, surveying vessels, hospital ships, etc.

10th. Torpedo vessels and torpedo boats of different types and value. The torpedo vessels are eight, Folgore, Saetta, Nibbio, Avoltoio, Sparviero, Aquila, and Falco. The Folgore and Saetta displace 377 tons, and the Nibbio class 160 tons. The speed of the first two is about 18 knots, of the others 20 knots. The torpedo-

* A strategical ship must possess high speed and large coal endurance, and be capable of independent action. The proper place of a tactical ship is as a unit in a squadron.

boats are divided into three categories. The first contains ninety-three Schichau and Yarrow boats, known as sea-going torpedo boats. The second class consists of fifty-eight boats of lighter construction; the twenty boats of the third class are only available for harbour defence.

Ships completing.

The belted cruisers, Carlo Alberto and Vettor Pisani, are sister ships of 6500 tons displacement, 13,000 I.H.P., and 20 knots speed. They are built of steel produced at the Italian factories of Pra, Sestri Ponente and Terni, with a double-bottom extending for 148 ft. of the length under the space occupied by the engines and the boilers. These are eight in number, set in four compartments and provided with thirty-two furnaces. They are of the so-called marine type and rather obsolete. Two independent engines drive two four-bladed screws. 600 tons of solid fuel are stowed in the coal-bunkers, but space is provided for carrying 400 additional tons. The furnaces are also provided with the necessary appliances for the use of liquid fuel.

The Dandolo is now at Spezia, as already mentioned, receiving on board her new boilers and armament, which will consist of four 10-in. B.L. guns, seven 6-in., and five 4·7-in. Q.F. guns. As soon as the Dandolo is ready for sea, her sister ship Duilio will undergo the same modifications, which entail an expense of about £200,000 in each case. The advantages gained are as follows: the dead weight is decreased by 820 tons, which causes a corresponding reduction in displacement; and while with her former armament the Dandolo drew nearly 29 ft. of water, she will now draw only 27 ft. 3 in.

Ships on the stocks.

1st. Two steel-armoured battleships of a new type, Amiraglio di St. Bon and Emanuele Filiberto. Both the ships belong to the Francesco Morosini type modified, since the armour extends the whole length of the water-line. Their motive power consists of two triple-expansion engines in two separate compartments. The twelve boilers belonging to each engine occupy four compartments. The range of action of these powerful battleships is calculated for 7500 miles at 10 knots speed, for 2400 at 16 knots, and for 1500 at 18 knots. Their displacement is 9800 tons. Their engines are estimated to develop 14,000 I.H.P. Their draught of water, 24 ft. 6 in., will enable them to go through the Suez Canal.

2nd. Two steel-armoured belted cruisers, Giuseppe Garibaldi and Varese, of the Vettor Pisani type slightly modified. They displace 6840 tons, and have a maximum speed of 20 knots.

3rd. One steel-armoured belted cruiser, of 10,000 tons displacement, 420 ft. long, 65 ft. 6 in. broad, 25 ft. 3 in. draught of water, with

18,000 I.HP.; the speed estimated is 23 knots. This valuable addition to the Italian fleet has not yet received its name. Mr. Alfredo Micheli is the designer of the ship.

4th. Two torpedo cruisers, Agordat and Coatit, of the Aretusa type modified, have been designed by the Mr. Naborre Soliani. They will be 308 ft. 5 in. long, and 26 ft. broad, and will displace 1100 tons. The maximum speed is to be 22 knots, with 7500 I.H.P., for the former, and 26 knots, with 13,000 I.H.P., for the latter.

5th. Two torpedo-boat destroyers of the type represented by the Daring in the British fleet.

6th. Two sea-going torpedo-boats of the Schichau type.

In the Naval Estimates for 1896-7 a sum of £880,000 is provided for building the above ships. Some are to be built in the Government dockyards and some in the private yards, as shown below:—

Name of Ship.	Where Built.	
Amiraglio di Saint Bon	Venice	Government Dockyards.
Emanuele Filiberto	Castellammare	
Puglia	Taranto	
N. N. (Destroyer)	Venice	
Agordat	Castellammare	
Coatit	Castellammare	
Giuseppe Garibaldi	Sestri-Ponente (Ansaldo & Co.).	
Varese	Leghorn (Orlando Brothers).	

The classification we have adopted for the vessels of the Italian fleet, in order that our readers may grasp immediately the strategical and tactical value of the different ships, is not the one adopted by the administration. According to the official classification the fleet is divided into groups as follows:— Official classification.

1st class	(includes battleships over 9,000 tons).
2nd class	(includes armoured cruisers, 6,000 to 9,000 tons).
3rd class	(includes old battleships, 4,000 to 6,000 tons).
4th class	(cruisers, 3,000 to 4,000 tons).
5th class	(cruisers, 2,000 to 3,000 tons).
6th class	(torpedo gunboats, 500 to 2,000 tons).
7th class	(torpedo catchers, over 100 tons).

1st class torpedo boats	(over 100 tons).
2nd class „ „	(60 to 100 tons).
3rd class „ „	(30 to 60 tons).
4th class „ „	(under 30 tons).

Subsidiary Ships (including older types of unarmoured ships).

1st rate	(over 4,000 tons).
2nd rate	(2,500 to 4,000 tons).
3rd rate	(1,000 to 2,500 tons).
4th rate	(under 1,000 tons).

Auxiliary Cruisers.

Auxiliary Despatch Boats.

The three principal Government dockyards, viz., Spezia, Naples, and Venice, are not of the same working capacity, since the plant is

different in each case. Spezia has been chosen for fitting out the largest and most powerful ships of the Italian fleet; for instance, the Sicilia, which was built in Venice, was sent as soon as possible to Spezia to be completed. Naples is the dockyard to which the cruisers of the Etna type are attached, while all smaller ships depend on the Venice dockyard.

The dockyard at Spezia covers an area of 629 acres, including the basins, dry-docks, etc. The dry-docks are five in number; three are 433 ft. long and 105 ft. wide; the others are 361 ft. long and 98 ft. 6 in. wide. The workshops belonging to the dockyard are furnished with the best machinery of English, German, and Italian make. The number of hands employed in the dockyard at Spezia is variable; 4000 is about the average number.

Besides the dockyard the Government establishments in the Gulf of Spezia include the small basin of San Vito, with its extensive gun factory, and San Bartolommeo, where everything belonging to submarine mines is stored. There are two building slips at Spezia, one at S. Vito (for smaller ships), and two at San Bartolommeo.

The dockyard of Naples covers an area of 18 acres, and has only one dry-dock, 229 ft. 8 in. long and 72 ft. wide, but the dockyard at Castellammare has an area of 22½ acres, of which 6¾ acres are occupied by buildings. The Italian naval establishments in the Bay of Naples, therefore, deserve some attention. At Castellammare there are four slips.

At Venice there are two fine dry-docks, 361 ft. in length, and two slips. At Venice the Italian Government has its best plant for founding and forging iron and steel. Caranto has already a fine new dry-dock large enough for the longest ship of the Italian fleet, viz., the Trinacria. The total number of workmen employed in these dockyards and in the smaller naval establishment of Maddalena is about 15,000.

None of the Government dockyards have the necessary plant for turning out engines of modern pattern. Thus the State depends entirely upon the firms of Gio. Ansaldo & Co., Nicolo Odero (Sestri-Ponente), Orlando Bros. (Leghorn), Guppy and Hawthorne (Naples), and Pattison (Naples). This system has proved economical and reliable. The raw material for ship-building is also now produced in Italy, so that a very small proportion of the cost of an Italian man-of-war is incurred abroad.

Private yards.

The oldest and most important of the private yards is that of Ansaldo & Co., which has iron works at Sampierdarena, a ship-building yard at Sestri-Ponente, and a small factory in Genoa harbour. The Sampierdarena establishment covers 19¾ acres, and can employ

4000 hands at once. It is well equipped with engine power and machinery, and since 1870 has supplied 33 engines for Italian men-of-war, of from 1000 horse-power (for torpedo-boats) up to 19,500 (for the battleship Sicilia). This firm provides all the other shipbuilding yards of Italy with the larger forgings required in the construction of a ship, such as stems, stern posts, rudder frames, etc. Messrs. Ansaldo have now in hand an engine of 13,000 horse-power and eight boilers (Admiralty type) for the Giuseppe Garibaldi, and one of 13,500 horse-power for the Amiraglio di Saint-Bon. The yard at Sestri-Ponente dates from the year 1887, and can give work to about 3000 hands. The firm is now building the belted cruiser Giuseppe Garibaldi, sister ship to her namesake sold to the Argentine Republic.

The firm of Nicola Odero at Sestri-Ponente has furnished the Italian Navy with fifty-five ships of small size, chiefly torpedo vessels and torpedo-boats. The number of hands employed is 800.

Orlando Brothers have been the lessees since 1866 of the Leghorn navy yard, which is national property. The establishment has an area of 24¾ acres, of which nearly 9 acres are occupied by buildings. A dry-dock, 443 ft. long, and fit for receiving ships that draw 750 of water, belongs to the establishment. There are five building slips, and 1500 workmen are employed all the year round. At present Messrs. Orlando have in hand the steel-belted cruiser Varese and the propelling machinery for the protected cruiser Puglia. The firm has built twenty-two men-of-war and have engined fifteen.

The private establishments in the Gulf of Naples are those of Guppy and Hawthorne and of Pattison. Their collective capacity is equal to that of Ansaldo.

The Italian Government has no gun or torpedo factory of its own for the Navy. Both guns and torpedoes of every description on service are furnished by two private firms. Lord Armstrong's gun factory at Pozzuoli, near Naples, provides the fleet with large guns as well as with secondary and quick-firing ordnance. The torpedoes (called in Italian *siluri*) are made in Schwarzkopf's torpedo factory at Venice.

Summing up together the three different headings into which the estimates are divided in Italy, the money allotted to the Navy for the fiscal year 1896-7 amounts to 97,336,488 lire. Deducting £63,000 for the Mercantile Marine which, according to the continental system, is administered by the Secretary of State for the Navy, and £880,000 for new construction, the sum allowed for ships in commission and in reserve, ordnance, torpedoes, fuel, pay, victuals, and sundry expenses amounts to £3,030,400, that is £72,220 less than during the fiscal year 1895-6. Naval estimates.

Officers of the Navy.

One admiral, six vice-admirals, 13 rear-admirals, 56 captains (*capitani di vascello*), 70 commanders (*capitani di fregata*), 70 lieutenant commanders (*capitani di corvetta*), 311 lieutenants, 167 sub-lieutenants, and 115 midshipmen (*guardia marina*) constitute the combatant branch of the active list of the Navy. The *Corpo del genio navale* comprises 80 officers of the constructive staff (*ufficiali ingegneri*), as well as 204 officers of the corps of engineers (*ufficiali macchinisti*).

The commissariat staff (*Corpo di Commissariato*), which corresponds to the paymasters of the British Navy, is composed of 285 officers. The medical staff numbers 174. For administering the different branches of the service ashore (dockyards, barracks, workshops, store-rooms, etc.) there is a corps of 135 officers, known as *Ufficiali del Corpo R. Equipaggi*. These officers have some resemblance to the English warrant-officers. The harbour-masters (*Capitani di porto*) are also under naval administration. They are 218 in number.

Summing up together all the officers of military rank belonging to the fleet in a direct or indirect way, we arrive at a grand total of 1902 officers. This is rather an abundant staff for officering 20,709 petty officers and men.

The whole of the *personnel* under the rank of the officer is known as the *Corpo Reale Equipaggi*, and is, as regards administration, pay, and clothing, under a rear-admiral, who resides at Spezia. The force is divided into two sections, *personale navigante* (sea service) and *personale costiero* (coast service). The former is 16,499 strong and has a higher rate of pay.

Training of officers.

Young gentlemen not older than nineteen and not under seventeen years of age may enter the Naval Academy of Leghorn if they prove successful in a competitive examination. This is conducted by a board, composed of professors of the Academy and naval officers, presided over by a rear-admiral. After having passed three years in the Naval Academy, the successful candidates are promoted to the rank of midshipman. During the summer they cruise on board a special squadron of corvettes, where they are trained in all branches of seamanship and gunnery. Those who fail in the examinations, or are deemed unfit for executive rank, are entered as paymasters or engineers, and in this latter case they undergo a course of special professional instruction.

The medical staff of the Navy is furnished from the numerous national universities. The administrative staff is recruited among petty officers who pass the required examinations, among naval cadets who failed in theirs, or among young men who have already

graduated in the superior civil schools and wish to enter the Navy. The knowledge of one or more foreign languages obtains higher marks.

Schools.

The *Scuola Superiore Navale* of Genoa has been the place where all the Italian naval engineers have been trained. It is frequented by young men who have obtained degrees in the higher schools, whether classical or technical. As there is a school for midshipmen, so is there one for assistant engineers; only the annual fee paid by the families to the Government is £32 for the Naval Academy of Leghorn, while it is reduced to £10 for the boys in the College of Engineering, *Scuola Allievi Macchinisti*, situated in Venice. Boys must be between fourteen and seventeen years of age at the moment they compete in the entrance examination, which is not very difficult, and extends only to the elements of mathematics, and the Italian and French languages. The boys, notwithstanding the examination they have to pass, must be already provided with what is called in Italy *licenza tecnica*, corresponding to the *real-schule* certificate of Germany. In both cases (that is of the Naval Academy and the Engineering College) children of army and navy officers killed on active service or in war, as well as children of officers decorated for bravery in battle, are exempted from paying any fee. The cadets in the Engineering College make a short cruise in the summer, limited to the Adriatic Sea.

Corpo Reale Equipaggi.

The category of officers known as the *Ufficiali del Corpo Reale Equipaggi* are recruited from the rank and file of the Navy. Twenty-five officers ranking as captains in the army, fifty-five ranking as lieutenants, and fifty-five ranking as sub-lieutenants, form the staff of the *Corpo R. Equipaggi*; seventeen are drawn from the seamen class, and have been serving as boatswains, quartermasters, etc.; twenty-two come from the *timonieri*—that is, from the navigating class; twenty-two are gunners; twenty-two are torpedo-men; twelve are masters-at-arms, and come from the dockyard employés; five are drawn from the works, and thirty from the clerks. When this class of officers was created in 1888 the then Minister wanted them to fill the place occupied in the English service by warrant officers. But in reality the step was taken to satisfy the claims of long and meritorious service, and at the same time to diminish the number of those appointments for the combatant branch. It has been always accepted in the Italian Navy that men before the mast are entitled after long service to become officers. This rank has been created in order to recompense good service. These officers are divided into seamen, gunners, torpedo-men, sergeants-at-arms, workmen, nurses and clerks, according to the sections they come from.

The harbour-masters are chosen from among officers who for some reason or other are unfit for very active service, but whose relative youth does not entitle them to go on to the retired list with a pension.

Promotion and retirement.

Flag and superior officers are entitled to a pension, and are exempted from active service after thirty years' presence in the list, provided they have reached the age of fifty-two if they are captains or commanders, of fifty-five if they are rear-admirals, of sixty if vice-admirals. Lieutenants and sub-lieutenants retire at the age of forty-five. By a special regulation, vice-admirals who have reached sixty-five years of age, rear-admirals at sixty, captains at fifty-five, commanders at fifty-two, lieutenant-commanders at fifty, lieutenants at forty-five, are by a compulsory measure put on a reserve list, *servizio auxiliario*, which may perhaps best be translated by the English expression furlough. The pay of these officers is equal to the pay of the retired officers of their rank, plus an allowance of £40 for vice-admirals, £24 for rear-admirals, £16 for captains and commanders. Officers who are in this reserve list may be called upon to serve temporarily on the active list. Promotion is subject to rather complicated rules, of which the time passed at sea, war service, the reports of commanding officers, and, above all, seniority, constitute the principal elements. Interest is of no avail whatever. Examinations are compulsory for obtaining promotion to sub-lieutenant and lieutenant. They cease, of course, for superior rank. All officers who have served their time, as well as those who voluntarily resign, are placed upon the naval reserve list. But since naval reserve men are never called up to drill or to perform any service, it is certain that the reserve is absolutely valueless.

Seamen recruiting and training.

The basis of the system for recruiting seamen for the Italian fleet is the draft made upon all men of twenty years of age, who have served at sea for eighteen months or more. The Government takes only a part of the annual draft; the rest is left free, but must be ready for service in case of war. Generally speaking, four annual drafts are kept in service, or, in other words, men taken from the annual draft serve four years. This is a weak point in the organisation, and the remedy lies in the special enlistment of boys. Although the pay of the Navy is rather high, most of the men do not re-enter, notwithstanding the bounty they are entitled to on re-enlistment. The Government, therefore, applies every year for a special enlistment of boys, who are drilled in training ships and become in due time petty officers in the several branches of the naval service. Picked men from the annual draft are sent to the two training ships Italia and Trinacria, stationed at Spezia; the former being the gunnery

school and the latter the torpedo school. The ironclad Formidabile is attached to the gunnery school, so that the seamen-gunners can do their target practice under steam; while the torpedo-boat Goito is attached to the torpedo school. The battleship Lepanto is the training ship for boys. Three brig-rigged ships, Palinuro, Miseno, and Chioggia, are tenders to the Lepanto. One of them makes winter cruises, extended sometimes into ocean waters. All the training ships form a special squadron, which is commanded by a rear-admiral who flies his ensign on the Italia. The training squadron is kept in commission all the year round. The squadron of three corvettes for the young cadets of the Naval Academy is kept in commission only in the summer months.

Distribution of ships. For administrative purposes every ship, according to Italian regulations, is either placed *in armamento* (in commission) or *in riserva*. Ships in commission have their full complement of men. The officers enjoy the benefit of full pay, table money, and daily rations. All ships in commission (save those on special service abroad) are under the Commander-in-Chief of the active squadron, who is a vice-admiral, and has under his orders a rear-admiral in command of the second division. Ships in reserve form another squadron, commanded also by a vice-admiral with a rear-admiral as chief of the second division, whenever the strength of the squadron entails the necessity of two divisions. As regards efficiency the Reserve Squadron and the Active Squadron are alike; the difference between the two being restricted to a difference of pay and allowances, as the officers of the Reserve Squadron have table money but no daily rations.

Administration. The administrative machinery at the Italian Navy is very similar to that of France. The Minister of the Navy is fully responsible to Parliament, of which he is always a member, either of the Lower or the Upper House. He is generally an admiral. Under his orders there is an Under-Secretary of State, who deals with the executive part of the Minister's duties, and who has much the same relation to the Minister as a first lieutenant to his captain on board a man-of-war. The Under-Secretary of State's office has under it the following bureaux:—(1) Cabinet, (2) Chief of Staff, (3) the Dual Bureau, (4) the Paymasters. The three principal executive branches are headed by Directors-General. These are (1) the Director-General of the Personnel, who is usually a rear-admiral; (2) the Director-General of Shipbuilding, who is always a naval architect; and (3) the Director-General of Artillery—this place was occupied by the much-lamented Vice-Admiral Cothau, and had been created for Rear-Admiral Count Albini, well known and appreciated in England; (4) the Director-General of the Mercantile Marine. The

Minister is assisted by two consultative bodies. One is the Superior Naval Council (*Consiglio Superiore di Marina*), which was established in 1894, and is presided over by the Under-Secretary for the Navy. The other is the Committee on Designs (*Comitato per i desegni delle Navi*), established in 1890.

The three principal naval districts (Spezia, Naples, and Venice) are administered by a Vice-Admiral Commander-in-Chief, in whose hands is vested the military and administrative power. Each naval district is a copy on a smaller scale of the headquarters in Rome. Thus the functions of the Rear-Admiral Superintendent of the Dockyard corresponds to those of the Under-Secretary, and the several heads of departments, known as the directors of construction, fitting out, and ordnance, are the precise counterpart of the heads of the branches, while the Chief of Staff is to the Commander-in-Chief of the District as the Director-General of the Personnel is to the Under-Secretary of State.

Changes in 1895.

The naval administration during 1895 made itself particularly conspicuous for the great perseverance with which it followed and developed the well-known programme of Minister Morin: "Reduce the expenses of the shore service for the benefit of the sea service." Notwithstanding the reduction in the naval estimates, Admiral Morin was able in this way to obtain very good results and to pave the way for others, which have not as yet been much felt, but will be very much so in due course of time. Never, even in the years of more abundant naval estimates, that is, in the times when they reached £6,000,000 yearly, did the Italian Navy have so many ships permanently commissioned or in reserve, or so many officers and sailors afloat as she had in 1895. And these ships, and officers, and sailors were not lazily unoccupied in ports, but were kept in continual service. This is evident from the cruises in American waters, in the Red Sea, in the Indian Ocean, and in the Far East—of the Umbria, Cristoforo Colombo, Piemonte, Dogali, Curtatone, Liguria, Lombardia, etc., the Active Squadron's cruise to Kiel and to English seaports under H.R.H. the Duke of Genoa, and the recent naval expeditions in the Levant and the Red Sea. In spite of this activity the provision of fuel has been kept more complete than it has been for a long time.

Reduction of officers on shore.

The reduction of the expenses for shore service began with the decrease of the civil officers at the Ministry, which was followed by a similar reduction in the clerks of all the dockyards. A new regulation for the supervision of works introduced radical reforms in the organisation and administration of the dockyards, reducing to two the three branches of administration in each dockyard, and distributing

between the remaining two the functions of the suppressed third, thus doing away with unnecessary complications, and reducing, without any harm to the work, the number of dockyard hands. No new hand was admitted if his work was not strictly necessary. A new system of accounts of the *Corpo Reale Equipaggi* takes away some unnecessary complications of the systems in use up to last year, and entirely separating the administration of the men serving on board the ships in commission from that of the men serving on shore. By this new regulation a great reduction was effected in the number of paymasters and officers on shore. As a result of these changes, of the enlistment of 500 volunteers, and owing to the contingent of the annual draft fixed upon by the Naval Estimates, the *Corpo Reale Equipaggi* will reach on September 1st, 1896, a strength in numbers which it has never possessed before.

Rather than endeavour to lay down new ships the naval administration looked during the course of the year 1895, as the Minister repeatedly announced, to hasten the work already in hand. Notwithstanding this, and the scarcity of funds, the Minister did not neglect to study the new designs of ships corresponding to the most recent progress of naval warfare. The construction of two new ships was ordered at the royal dockyard of Castellammare. At the same time tenders were invited from private firms for the construction of several torpedo-boats and a torpedo-boat destroyer. As a favourable occasion presented itself for the sale of the cruiser Garibaldi to the Argentine Republic, the Minister favoured the sale, assuring with a good contract great advantages to the Royal Navy as well as to the national industry. Construction in 1895.

In the course of the year 1895 the new regulations for the Royal College of Engineering were discussed and finally settled. The course of study is reduced, and the College is opened to the bearers of certificates of studies gone through in public schools. Great economy is to be the result, and as the next regulation will insure at the same time a better system of recruiting, we shall obtain a mechanical *personnel* for our ships of superior qualifications. New regulations.

In the present year, 1896, the new regulations of the Naval Academy, as described above, will come into effect.

A new set of regulations have been drawn up and presented to Parliament for the promotion of naval officers. It is to be hoped that this will at last settle satisfactorily a very delicate matter, which has been up to now regulated by innumerable, antiquated, incomplete and sometimes even contradictory rules.

Another law was also elaborated and presented to Parliament for regulating our mercantile navy. The scheme is necessarily a very

imperfect one on account of the circumstances of the treasury, but it is to be hoped that it may help to put a stop to the decline of our mercantile marine.

Naval press and new books.

In Palermo a new naval periodical has sprung up under the name of *Rassegna Navale.* It has not yet the reputation of the *Rivista Marittima* and the *Rivista Nautica;* the former is justly considered as one of the best service papers of our day. The *Rivista Nautica* deals in yachting more than with purely naval subjects. Two valuable additions to naval literature have appeared during the year 1895. Both are second editions, much revised and increased. One is the *Storia Generale della Marina Militare,* by A. V. Vecchi, the other is the most valuable treatise of Count G. Martorelli, lieutenant-colonel in the corps of Naval Engineers and sometime Member of Parliament, *La Macchina a Vapore Marina.* This work is the text-book for the school of engineers in Venice. Count Martorelli is the translator into the Italian language of Sir W. H. White's Treatise on Naval Architecture.

JACK LA BOLINA.

CHAPTER VI.

Water-tube Boilers.

During the past year nothing of importance has taken place in the development of the marine engine. The three-stage compound type remains, as it has been for some time past, the standard design. Steel in place of iron, stronger bronzes, more ample bearing surfaces, and other concomitants of higher steam pressures and higher piston speeds are now the commonplaces of good marine practice. The boiler still lags behind the engine in spite of the fact that the record of marine engineering during the last two or three years consists almost entirely of efforts made to perfect the water-tube type of marine boiler. It is a fortunate thing that engineers have at last taken up in earnest the design of marine boilers on scientific principles, for up to recent times they have devoted their energies too exclusively to the using of steam when made rather than to the making of it.

It may be broadly said that, within practicable limits, the higher the steam pressure the smaller the coal bill. It has been a comparatively simple matter to design an engine that would use steam of the highest pressure generated by a shell boiler. This condition was illustrated by the introduction of the three-stage compound, or, as it is more generally called, the triple-expansion engine. The economic principles which govern the design of the compound engine were known years before the late Dr. Kirk commercially introduced the three-stage type to the world in the Aberdeen. It was the difficulty of generating steam at pressures sufficiently high to make the extension of the compound principle desirable that delayed the step from ordinary to three-stage compounding. Had it not been for the introduction of steel in boiler-construction the invention, or rather the practical development, of the seamless corrugated furnace, and the improvement in boiler-making machine tools, we might still be running our war vessels with the original compound engine at pressures not exceeding 80 lbs. to the square inch. In some cases, four-stage compound engines, or quadruple expansion engines, have been used with steam pressures from 200 to 250 lbs. to the square inch. These, however, are not common, and it may be said that the further extension of the compound principle awaits the perfecting of a type of boiler capable of generating steam at higher pressures in an

economical and safe manner. Whether the shell or tank boiler "has reached the end of its tether," as some assert, or whether the difficulties of generating steam at sea in large quantities in pipes are insuperable, as others maintain, it is not our purpose to inquire; but certainly the great engineering question of the day is the battle between shell and pipe boilers.

Admiralty and water-tube boilers.

The Admiralty authorities have not been backward in recognising this, and the boldness with which they are grappling with the problem must have astonished those persons, if any still exist, who take the once conventional view that the Admiralty is the stronghold of obstruction and meaningless conservatism. Whatever may prove to be the best form of water-tube boiler—most probably it has yet to be designed—marine engineers will do well in future to remember that it is the engineering department of the Royal Navy to whom the credit is due of successfully introducing water-tube boilers on a large scale. It needs great courage, and a strong sense of duty, on the part of a Government official to initiate an important change such as this. A new system, whatever may be its potential advantages, never works smoothly at first. It is human nature, especially sea-going human nature, to suffer patiently accustomed evils, but to be very intolerant of new difficulties. For this reason what might prove a trifling and remediable defect in a water-tube boiler may be considered to outweigh all the long-standing troubles experienced with the older type. Again, in making a change of this wholesale nature most powerful vested interests have to be attacked. If water-tube boilers supersede the present flame-tube shell boilers, many hundreds of thousands of pounds worth of boiler plant will become obsolete, and that is not a prospect contractors are likely to view with equanimity or suffer in silence. When it is considered how much easier—how much pleasanter and more peaceful it would have been for Mr. Durston and his colleagues to have treated the water-tube boiler as a new and fanciful device, to be first developed in the mercantile marine, one cannot but congratulate the country on possessing servants who prefer to risk censure and detraction rather than allow the warships of foreign nations to excel those of Great Britain in engine efficiency.

The two big cruisers Powerful and Terrible have each, as is well known, nothing but Belleville water-tube boilers to supply steam for their 25,000 horse-power engines; and we in England have so far followed the lead of the French that for war vessels water-tube boilers are becoming all but universal. Under these circumstances, it is evident that the main part of this chapter must be devoted to the boiler question.

The method of urging combustion of fuel in boiler furnaces by the system that is known as induced draught has occupied attention during the past year. The subject was brought forward at the spring meeting of the Institution of Naval Architects by Mr. W. A. Martin, who illustrated his paper by experiments. Unfortunately the conditions he selected were so dissimilar to those present in actual practice that no certain conclusion could be drawn from them. It is difficult to understand on general principles why "induced draught" should be more advantageous than "forced draught." There may be certain subsidiary advantages and disadvantages peculiar to each system; but, so far as the main issue is concerned, a theory which satisfactorily accounts for the superiority claimed for induced draught has yet to be brought forward. Mr. Martin and those who support his views, however, claim that this superiority has been proved by practical trials. In his paper he quoted the experiments made at Portsmouth with the old locomotive type of boilers taken from the Polyphemus; but the Engineer-in-chief to the Royal Navy stated in the discussion that the tubes in these boilers had already been damaged before the boilers were put through the experiments. Moreover, the conditions of trial were not quite the same with both systems. Trials were also made on H.M.S. Gossamer. Here the rate of evaporation was so low that no light can be said to have been thrown on the subject so far as forced draught is concerned. In the battleship Magnificent we have an object lesson on a very large scale. This ship was fitted with induced draught, whilst the sister ship the Majestic had ordinary forced draught. The engines of the Magnificent developed 12,157 I.H.P., whilst the Majestic's engines gave 12,497 I.H.P. The engines in both vessels are the same in main features, and each ship has eight single-ended boilers; those of the Magnificent have, however, 25,248 sq. ft. of heating surface, and 855 sq. ft. of grate area, whilst the Majestic's boilers have but 22,000 sq. ft. of heating surface and 820 sq. ft. of grate area. The air pressure on the Majestic's trial was very moderate, being under one inch (0·9″). No engineer would fall into the error of basing definite conclusions as to boiler efficiency—and draught is a factor in boiler efficiency—on horse-power developed by engines; but the figures quoted certainly do not tend to support the contention for superiority of induced draught. Induced draught.

There are, however, the incidental advantages attached to induced draught. It gives a less dusty stokehold, for the entering air is introduced gently through large orifices in place of being delivered in eddying currents, as from a fan. Moreover, the heavy and cumbrous air-locks may be dispensed with, so that there is always free egress Advantages of.

from the stokehold. On the other hand, the fan has to be put in a most unsuitable position, namely, in the path of the hot products of combustion from the furnace; and the volume of gases passing through the fan is much greater than when cold air only has to be dealt with. Whether there are other advantages in the actual burning of coal by induced draught practical experiment will probably show; but engineers, as a rule, before they accept a proposition as true, want very conclusive experimental evidence of its truth when they cannot explain it by scientific rules.

Water-tube boilers in H.M. ships.

The principal types of water-tube boiler that are now being tried or are about to be tried in the Royal Navy are the Belleville, Niclausse, Thornycroft, Yarrow, Du Temple, Normand, Blechynden, Reed, and White. The first two are large tube-boilers, which are considered more suitable for bigger vessels. The Belleville boiler, in addition to the two big cruisers referred to, is to be fitted to the first-class cruisers Diadem, Niobe, Europa and Andromeda, and the second-class cruisers Arrogant, Vindictive, Gladiator and Furious. The Niclausse boiler is being put into the torpedo-gunboat Seagull. The Thornycroft boiler is to be fitted in the third-class cruiser Proserpine now building at Sheerness. The Spanker, another of the torpedo-gunboats, is to have Du Temple boilers, and the Pelorus, a sister-ship to the Proserpine, will have Normand boilers. The five new battleships to be commenced during the present year are all to have water-tube boilers, probably of the Belleville type. The four first-class cruisers and three second-class cruisers will doubtless have Belleville boilers. The six third-class cruisers will no doubt all be fitted with water-tube boilers, though it is possible that, following the example of the Proserpine and the Pelorus, these vessels may have boilers of the small tube or express type.

Thornycroft boilers.

The Thornycroft boiler is the water-tube type of which the widest experience has been gained in the Royal Navy. It has been placed in a large number of torpedo-boats with conspicuous success, as well as in eighteen of the torpedo-boat destroyers, one of which—the Boxer—is, at the time of writing, the fastest vessel in the Royal Navy. The Speedy, one of the torpedo-gunboat class, which was built at Chiswick, has also this type of boiler. The latter vessel is notable from the fact that her engines developed about 25 per cent. more power than any other of her class, all the rest having shell boilers. The Thornycroft boiler is now being placed in three third-class cruisers, two of which are old vessels being re-boilered, and one, the Proserpine, before referred to, is a new ship being built at Sheerness.

Yarrow boilers.

The Yarrow boiler has been also placed in a large number of torpedo-boats, and in ten of the British torpedo-boat destroyers. The greatest

triumph achieved with this type of boiler, however, was in the Russian torpedo-boat destroyer Sokol, which, at the time of writing, is the fastest vessel of her class in the world. A notable departure in marine practice has been made in connection with this boiler, which is to be placed in three cruisers being built in Holland for the Dutch Navy—the Zeeland, the Holland, and the Friesland. They are each to have ten boilers, eight being of the Yarrow water-tube type and two of the ordinary return-tube type. The latter are to be used at ordinary rates of steaming, whilst the water-tube boilers will be brought into use when higher speeds are required. The ordinary boilers are estimated to give steam for 2250 I.H.P., and the Yarrow boilers are calculated to have steam-generating capacity for 7000 I.H.P. It may be said, however, that Yarrow boilers of the same kind, but 10 per cent. smaller, have give over 1000 horse-power each, with less than an inch of air pressure ; so that the Yarrow boilers in the Dutch vessels may safely be taken as equal to the latter power. The weights of the two classes of boiler are instructive. The two return-tube boilers in each vessel, with fittings and water, will weigh 120 tons. The Yarrow boilers, with fittings and water, weigh 11 tons each, or 88 tons in all. It will be seen, therefore, that these express water-tube boilers, power for power as estimated, are only about one-quarter the weight of the return-tube boilers. In regard to space occupied, there is also a considerable saving, although in this feature the advantage is not so marked as in the matter of weight.

Normand boilers.

The Normand boiler has been fitted to a larger number of British destroyers than any other type of steam generator, due to the fact that it has been largely taken up by the northern firms who have contracted for these vessels. No less than twenty-six boats in all have this type of generator allotted to them. It has been placed in several craft built by Messrs. Normand, at Havre, notably in the torpedo-boat Forban, which at the present moment is the fastest vessel in the world. The Blechynden boiler has been placed in three destroyers, the Reed boiler will be in eleven, and the White boiler is in four; whilst six of the destroyers have the old locomotive type of boiler. It may be said generally that so far all the water-tube boilers have justified their choice in spite of one or two untoward events, and have conclusively proved their superiority in steaming powers over the old locomotive type.*

* Most of the boilers mentioned have been illustrated in the pages of *Engineer* or *Engineering*. The reader is also referred to two papers read by Mr. J. T. Milton before the Institution of Naval Architects, one on July 13th, 1893, and the second on March 15th, 1894. A paper read by Professor W. H. Watkinson before the Institute of Engineers and Shipbuilders of Scotland, on January 22nd, 1895, should also be consulted, as it contains a lucid though brief exposition of the principles governing circulation.

Trials of Sharpshooter.

The trials of the Powerful and the Terrible will probably take place some time during this summer. They will be looked forward to with the greatest interest, and it is to be hoped they will throw some certain light on the water-tube boiler as applied to large ships. We know the torpedo-gunboat Sharpshooter, which has been fitted with Belleville boilers, has been subjected to an extended series of experimental trials, with the results of which our Naval authorities express themselves satisfied. An Admiralty return has just been issued which gives the results of these trials. The most favourable of these shows that, with a total I.H.P. of 2194 when burning 18·8 lbs. of coal per sq. ft. of grate per hour, the coal consumption per I.H.P. per hour was 1·73 lbs.; the I.H.P. per sq. ft. of heating-surface was 2·63. The boilers are reported to have worked well throughout the trial. The fuel economy, of course, is good, but it is to be wished that the rates of coal consumption had been carried higher so as to have given a harder test to the boilers.

General principles of boiler design.

Although there is not space in this chapter to compare the different forms of water-tube boilers now before the world, it will not be out of place at this time of transition to remind our readers of the cardinal virtues of steam generators. With a given weight of good dry steam to be provided at any required pressure, the boiler that will produce it with the greatest economy of fuel, with the least total weight of apparatus contained in the least space, is the best boiler, other things being equal. The other points to consider are that it must not be too dear at first cost, it must be sufficiently durable, it must not be expensive in upkeep, it must be accessible to clean and repair, it must not be too difficult to operate, and it must be trustworthy in supplying steam at a fairly steady pressure. There are subsidiary considerations, but these are the main points. Many of these conditions are antagonistic, and the boiler, like the war-ship itself, must always be a compromise. For instance, compactness and light weight can be obtained at the sacrifice of fuel economy; whilst extravagance at first cost will secure a good many desirable features in other directions. It is for the engineer to give values to the various elements of design, and for the naval authorities to decide which affords the maximum of fighting qualities.

Advantages of water-tube and shell boilers.

The placing of the large number of water-tube boilers of all kinds in the ships of the British Navy constitutes a practical experiment on a heroic scale, the making of which cannot fail to add immensely to the knowledge of engineers all over the world, and, if the expectations of inventors are fulfilled, will entirely revolutionize the practice of marine engineering. Pending the completion of this extensive trial, it would be rash to dogmatise on the result, but

there are one or two obvious points which may be referred to. In the first place, the water-tube boiler is manifestly inferior to the ordinary shell type in respect to plugging tubes. On the other hand, it is composed of small parts, and can be removed or erected on board without tearing up decks. In nearly all types the stoking is easier. Water-tube boilers are generally lighter than shell boilers, those of the express type immensely so. They contain far less water, also an advantage in regard to lightness and rapidity of raising steam, but a disadvantage in increasing the difficulty of keeping steam regular and maintaining a constant water-level. The question of space occupied is to some extent an open one between the shell and water-tube boiler, but as a rule the express boilers have an undoubted superiority in compactness. The Dutch cruisers already quoted afford an example. Durability and fuel economy are the two points in which the supporters of shell boilers say the latter chiefly excel. So many contradictory reports have been made about coal burnt that engineers are at a loss what to believe. We have one trustworthy test made with the Thornycroft boiler by Professor Kennedy—and we could not have a better authority—showing that type of generator to be highly economical. Good results have also been obtained with the Yarrow boiler, and it is well known M. Normand runs his torpedo craft with very low fuel rates. In regard to durability, not much can be said of a definite nature as the question is only to be settled by extended experience. One can hardly doubt, however, that the cylindrical vessels (*i.e.*, the top and bottom receivers), characteristic of so many types of water-tube boiler, will have a very long life. It is the tubes that are open to question. With the Belleville boiler the experience is ample, but the evidence contradictory. Those interested, and it is they who speak with the authority of experience, say that the tubes last long, and that accidents are rare. Others tell quite a different tale. Probably truth rests chiefly with the former; and the Belleville boiler is fairly durable and fairly economical so long as it is not hard worked. Whether with its long and tortuous steam-generating passages it will stand forcing is a point upon which naval engineers will look to have certain evidence before they pin their faith to the type.

Express boilers.

Turning to the express type we find that two torpedo-boats fitted with Thornycroft boilers have worked for five years before the boilers required re-tubing. It must not be forgotten that the tubes in shell boilers have to be renewed at times. After making every allowance, however, there is no doubt that water-tube boilers require more care than ordinary shell boilers, and this applies especially to the express classes. Purer water must be used, greater care must be exercised

to prevent corrosion, but, above all, every precaution must be taken to prevent the admission of grease with the feed-water. On the other hand, a water-tube boiler will stand an amount of ill-treatment in heating and cooling which would be fatal to a shell boiler.

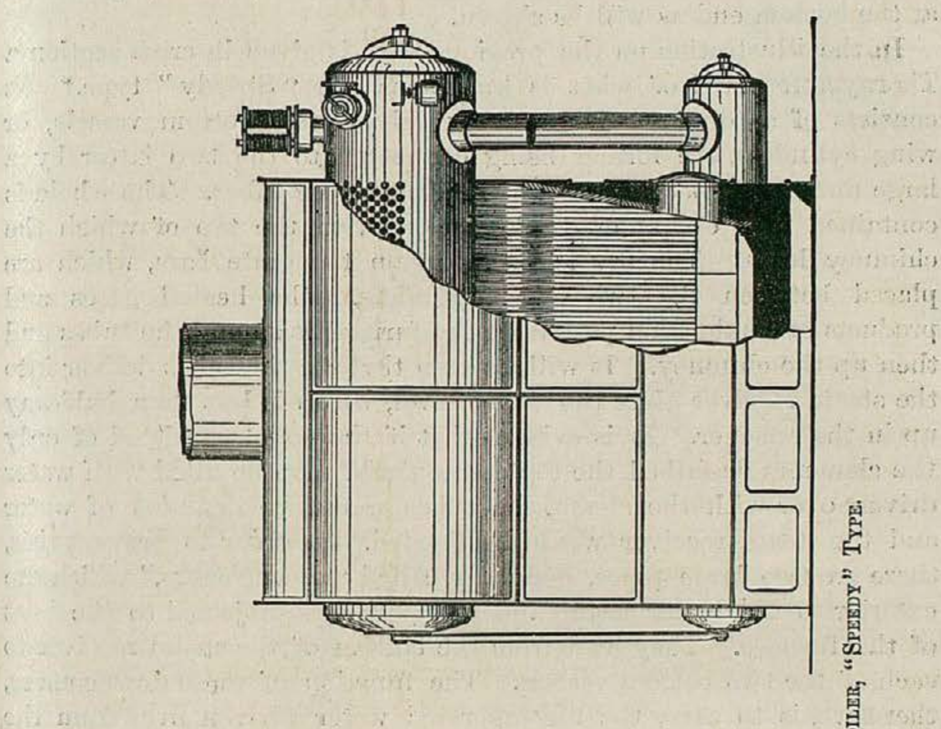
First cost is a matter we can hardly touch upon here for obvious reasons. Water-tube boilers are certainly expensive, but there are often heavy patent royalties. As experience is gained and as special methods for making the boilers in quantities are devised, the cost will be greatly reduced.

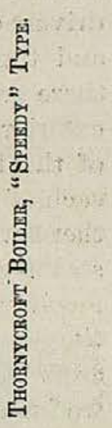
Feed control.

Reference has been made to the difficulty of varying water-level with pipe-boilers worked in groups, and it is to overcome this that Mr. Thornycroft has introduced a device to which prominence has been given during the past year. It consists of a float placed within the upper drum of a boiler, and which acts on a valve regulating the feed. As the whole of the apparatus is within the boiler, the old objection of working through a stuffing-box is removed. The mechanism is simple and effective, being remarkably sensitive, as there is no deadening effect due to friction of packing. Other methods of regulating boiler-feed have also been introduced.

Circulation in water-tube boilers.

The chief point to consider in designing a water-tube boiler is the due provision for circulation of water and steam. Therefore in estimating the value of any type the first thing to look to is whether this feature is secured. In order to make the subsequent remarks clear, it is necessary to explain why circulation is so necessary in water-tube boilers. If a tube several feet in length and, say, an inch to an inch and a quarter in diameter be filled with water and placed vertically in a fire—the lower end of course being closed—steam will be formed. If the bottom part of the tube be subjected to the greater heat, steam will be generated there first; and, further, if the fire be fierce, evaporation will be so rapid that it will drive the water violently out of the top of the tube, and the tube will then get burnt. If the tube be large in diameter in comparison to its length, if in fact it become a cylinder, such as an ordinary domestic saucepan, the water will not be driven out, for the steam bubbles will be able to rise through the mass of water. If the tube at its upper end discharge into a vessel containing water, the water may run down the pipe as steam is formed, and will do so if the rate of heat transmission be slow. The tube will be thus protected from burning. In a small-diameter tube the evaporation at ordinary rates of combustion would be so rapid that the water running down would become steam before it had travelled far, and would thus force its way up again, blowing out other water trying to descend by gravity. To attempt to thus feed a tube from the top would be like trying to pour sand down a small pipe from





THORNYCROFT BOILER, "SPEEDY" TYPE.

which a very strong blast of air was issuing. But though water cannot be introduced from the top, it can be very readily passed in at the bottom end as will be shown.

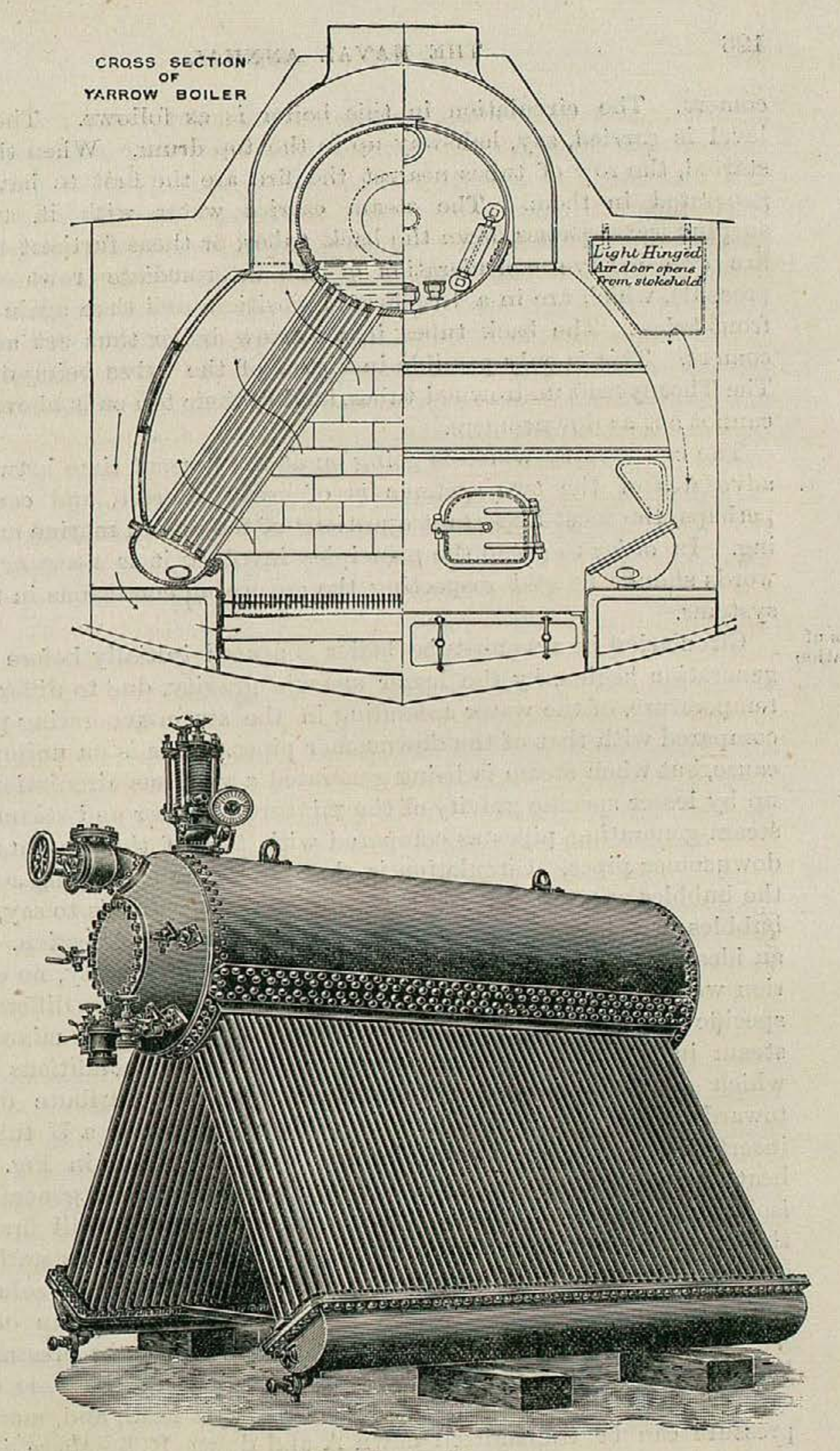
The "Speedy" type of boiler.

In the illustration on the previous page is given in cross section a Thornycroft boiler of what is known as the "Speedy" type.* It consists of a top drum, or steam receiver, two bottom vessels, or wing cylinders, the former being connected to the two latter by a large number of bent pipes or steam-generating tubes. The whole is contained in a casing, or smoke jacket, from the top of which the chimney leads. The fire is made up on the grate bars, which are placed between the two wing cylinders. The heated gases and products of combustion pass from the furnace to among the tubes and then up the chimney. It will be seen that all the tubes deliver into the steam receiver *above* the water level, which is less than half-way up in the receiver. It is evident that if the boiler consisted of only the elements described, the top drum would soon be filled with water driven over with the steam, the tubes would be denuded of water and the steam receiver would be flooded. In order to prevent this, there are two large pipes, generally called "downcomers," which are exterior to the boiler casing and therefore not subjected to the heat of the furnace. They lead from the bottom of the steam receiver to each of the two bottom vessels. The function of these downcomers, therefore, is to carry the unevaporated water (driven over from the steam-generating tubes into the steam receiver) from the steam receiver back to the bottom vessels, from whence it can rise again in the generating tubes, and thus the circulation is secured. Mr. Thornycroft has found by a very beautiful experiment—which unfortunately we have not the space to describe—that on one occasion 105 times as much water was carried over by circulation as was evaporated. The quantity would naturally vary with different conditions of working.

Drowned tubes.

The Yarrow water-tube boiler, of which a perspective view of the steam-generating part is given on the opposite page, differs from the Thornycroft boiler in principle. These two may be taken as representative types, a large number of other express boilers now introduced being modifications or combinations of the principles they embody, though there are often alterations in detail. The Yarrow boiler, as will be seen, has the top cylindrical receiver and the two wing chambers, but the generating tubes connecting these are straight, and deliver into the top receiver *below* water-level; they are, in fact, "drowned" tubes. Moreover, the Yarrow boiler has no outside down-

* The Daring type of boiler is the most recent of Mr. Thornycroft's designs, but the "Speedy" boiler lends itself more readily to our explanation. In both types the same principles are involved.



THE YARROW BOILER.

comers. The circulation in this boiler is as follows. The water-level is carried, say, half-way up in the top drum. When the fire is started, the row of tubes nearest the fire are the first to have steam generated in them. The steam carries water with it, and that surplus water passes down the back tubes, or those furthest from the fire (we reserve consideration of the intermediate rows for the present), which are in a less heated position, and then again up the front tubes. The back tubes in a Yarrow boiler thus act as downcomers. This is only possible in virtue of the tubes being drowned. The Thornycroft undrowned tubes, having their top ends above water, cannot act as downcomers.

The controversy which is going on at the present time between the advocates of the two systems is of great interest, and comprises, perhaps, the most important questions of the day in marine engineering. In order to grasp the principles involved it is necessary a few words should be said respecting the governing conditions in the two systems.

Causes of circulation

Circulation in a water-tube boiler is caused initially before steam-generation begins, by the lesser specific gravity, due to difference of temperature, of the water ascending in the steam-generating pipes as compared with that of the downcomer pipes. This is an unimportant cause, but when steam is being generated a vigorous circulation is set up by lesser specific gravity of the mixture of water and steam in the steam-generating pipes as compared with that of the contents of the downcomer pipes. Circulation is also due to the entraining action of the bubbles of steam passing through the water; that is to say, as the bubbles travel, water moves with them in the same direction. With an ideal or perfect fluid—that is, one free from viscosity, no circulation would be set up by isolated bubbles. Although the difference in specific gravity of the columns of water and of water mixed with steam in two pipes causes circulation, there are conditions under which such difference may exist and yet not contribute directly towards circulation. To illustrate this we will take a U tube and insert the ends in a top vessel holding water, as shown in Fig. 1. If heat be applied to the left-hand leg, steam may be generated in isolated bubbles as shown. For simplicity sake we will first treat the problem statically, thus assuming the bubbles to be stationary, and we then find that though the specific gravity of the column of steam and water A will be less than that of the column of solid water B (taking the whole mass of the columns), yet the pressure due to head at the base of A is not less than that at the base of the column B, because both are subject to the same head, and, moreover, pressure can be transmitted down A and down B, for there is con-

tinuous water throughout the circuit. What is true of actual water at rest would also be true of a perfect fluid though the bubbles were rising. If, therefore, we select any point C, we find that pressure from the water surface is transmitted equally down A and down B; the pressures balance each other, and there is no tendency for the water to move in any direction, or for circulation to be set up owing to difference of specific gravity of the two columns as a whole.* But we cannot treat this as a static problem, and as, moreover, no perfect or non-viscous fluid exists, there would be a circulation due to the entraining action of the ascending steam bubbles, and this

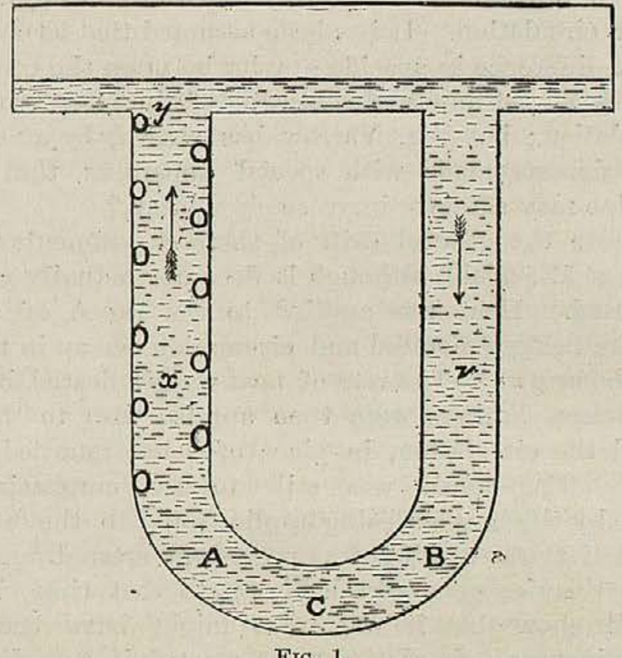


Fig. 1.

departure from our imaginary conditions must be allowed for. The conditions shown in Fig. 1 suppose a slow rate of heat transmission, and they do not represent the phenomena generally present in boilers of the type under consideration, when in active work.

Turning again to Fig. 1, let us imagine the evaporation to be so rapid that, in place of isolated bubbles, there is in the upper part of the tube A—say from x to y—a foam mass of water and steam, filling this part of the pipe. We have now broken the continuity of our water column in A. At x, where the foam begins, there is a pressure downward due to the head of water in the tank above the pipe and to the weight of the froth in the pipe. That pressure is exerted in

* We now neglect the possible variation in specific gravity due to difference of temperature.

the direction contrary to the flow of circulation. But acting with the circulation is a pressure due to the head of water from the water-level to the point x (which is level with v), and this pressure is exerted upwards because it is conveyed down the pipe B, round the bend, and up the pipe A; in other words, there is a balance of pressure upwards at x. This causes circulation in the direction indicated by the arrows.

Outside "down-comers."

We may now proceed to discuss the question of outside or cold downcomers (Thornycroft system) as compared to the inside or heated downcomers of the Yarrow boiler, in which, as stated, the back rows of pipes furthest from the fire convey downwards the water which is required for circulation. It has been assumed that as circulation depends on the difference in specific gravity between the contents of the upcast and downcast pipes, the heating of the latter would tend to check circulation; but Mr. Yarrow has shown, by a very valuable set of experiments made with special apparatus, that heating a downcast pipe may actually increase circulation.*

Mr. Yarrow's experiments.

To illustrate the general drift of these experiments we will use Fig. 1 on page 127 again, although it does not actually represent the apparatus used. Heat was applied to the leg A of an inverted siphon, steam being generated and circulation set up in the direction shown by the arrows. The rate of flow was indicated by a suitable device. Bunsen burners were then applied also to the downcast tube B and the circulation, in place of being retarded, was much accelerated. The result was still further emphasized in one experiment by the burners being applied only to the downcast leg, when circulation was continued as previously started. All this was contrary to theories generally held up to that time, but a little thought will show that it was what might have been expected. Suppose, for instance, circulation to be started in one direction, and a bubble of steam to be generated at the point v in the downcast leg, and suppose, for the minute, it were to remain constant in volume. The bubble would be carried downwards by the flow of water, against its natural tendency to rise. To that extent it would check the flow of circulation. When the bubble had passed the lowest point, C, in the tube, it would rise, and when it reached the point x, which is opposite v, its accelerating action would have been operating through the same distance as its retarding action; or, to speak more correctly, the work done against the bubble in the descent would be balanced by that done by the bubble in the ascent, so that the bubble would have a balance of accelerating energy in hand measured by the

* A full account of these experiments with illustrations of the apparatus appeared both in the *Engineer* and in *Engineering* of the 10th January, 1896.

vertical distance travelled—*i.e.* from x to the top of the tube, if not to the surface of the water.

The bubble would descend (supposing it to remain constant in volume) at a slower speed than it would ascend. It is not necessary to consider this point at length, but it suggests another interesting phenomenon that was pointed out by Mr. Yarrow. As the imaginary bubble descends, it is subjected to increased pressure, due to increasing head of water, and therefore (according to the well-known law which provides that saturated steam of a given temperature cannot exist above a corresponding pressure) the bubble of steam would be reconverted into water with the increase of pressure due to the greater head. This is supposing there were no further increment of heat, and in that case the water would remain water until it reached the point in the upcast tube where the pressure (due to head) was the same as that at which it was originally generated.

The friction of water and steam in passing through tubes retards and tends to destroy circulation. The extent to which this acts depends on the diameter of the tube, its length, and the rapidity of evaporation. This was well shown in an experiment Mr. Thornycroft made by heating in a smith's fire the bend of a copper pipe of U form and leading into a tank, as shown in Fig. 1. The tube was burnt, though the vessel was supplied with water. The pipe was, however, much smaller in diameter (about $\frac{1}{4}$-in. bore) than is used in any water-tube boiler, unless it be of such a special type as the remarkable steam generator Mr. Maxim adopted for his flying-machine. Here, however, Mr. Thornycroft's experiments were confirmed, as Mr. Maxim had to introduce a special circulating device. We are not aware of any tubes less than 1 inch in diameter being used in a water-tube boiler intended for marine work, unless it may be for small powers, and this diameter appears sufficient to prevent undue retardation from friction in average designs. Sudden bends in pipes, or other causes of abrupt change in the direction of flow also retard circulation.

Intermediate tubes.

The U tube, with top reservoir, illustrated in Fig. 1, consisting only of one upcast and one downcast pipe, does not represent a water-tube boiler either of the Yarrow or Thornycroft type. In the both, as will be seen by the illustrations on pages 123 and 125, there are several tubes in cross section. With the Thornycroft boiler, as already shown, the current of water and steam in the generating tubes must be upward (as they deliver above water), but some of the Yarrow drowned tubes are necessarily downcomers. Allowing the row furthest from the fire to act in the latter capacity, and the row nearest the fire to be upcast tubes, as is undoubtedly the case, we may imagine inter-

mediate rows less positively upcast or downcast until we might arrive at a position where the conditions were so balanced that a tube might be undecided in which capacity it would act, so that circulation might be altogether destroyed and tubes become burnt. This is a common argument, but it is worthy of notice that as upward circulation is due to the reduction of specific gravity of the contents of the pipe, and that in turn is due to formation of steam, therefore a check to circulation which leads to an excess of steam may cure itself. Supposing, for instance, a pipe to be full of stationary water, and all that water on an instant to flash into steam. Then a circulation of maximum energy would be set up and water would follow to preserve the pipe. One could imagine a succession of these floodings of brief duration following at intervals sufficiently far apart to endanger the tubes by burning. Mr. Yarrow's experiments with sections of boilers tend to show, however, that circulation once well established in a boiler is likely to be permanent, and though what is called the "geyser action" is apparent when raising steam, circulation appears soon to settle down in a steady manner, or if there be a change in direction of flow that change is extremely rapid; in short, that there will be no stagnant places or "steam pockets" in the pipes of boilers of the type we are considering.

Circulation in water-tube boilers, like every other engineering problem, is governed by natural laws, and to arrive at a just conclusion we have but to give due value to the ruling conditions. The trouble is that an important factor is apt to be left out, and there are also certain phenomena upon which our knowledge is scanty. For instance, it is supposed by some that surface tension may play an important part; but in what way has not yet been indicated. The working of the many able minds now engaged on this problem will result in more light being thrown on the subject, and in time we shall arrive at definite and well-established conclusions.

The foregoing notes are intended to bring forward, so far as space has permitted, some of the chief conditions governing circulation for the aid of those not professionally engaged in the design of this class of steam generators.

Propellers. The construction of so many vessels of similar design as the torpedo-boat destroyers has enabled some interesting information to be gathered on that very vexed question, the efficiency of screw-propellers. It is to be hoped in the interests of marine engineering science that the Board of Admiralty will consent to one of its professional officers communicating the results through a paper read before one of the technical societies. The remarkable success of these vessels in regard to speed has been almost wholly attributed to their water-tube

boilers, but a word should be said about the propellers. Broadly speaking, the substitution of a strong bronze such as manganese bronze, for the old forged steel blades has resulted in a very great gain in speed. For example, a destroyer running at 409 revolutions per minute made a speed of 26·25 knots with forged steel blades, but when propellers of manganese bronze of the same shape, area, pitch, and diameter were substituted, the speed was raised to 27·3 knots although the revolutions were reduced to 388 per minute. The displacement of the boat and other conditions were as nearly as possible alike on both trials. Again, in a torpedo boat with forged steel propeller-blades the speed was 23·21 knots at 378 revolutions per minute. With an almost similar propeller, excepting that it was of manganese bronze, the speed was 23·5 knots with 360 revolutions. It has also been found that with these fast boats an increase in diameter of propeller has resulted in improvement. Thus in a torpedo-boat having forged steel blades, a speed of 22·2 knots was obtained with 375 revolutions, but when the same propeller was increased slightly in diameter by the blades being drawn out under the hammer, a speed of 23·6 knots was reached with 380 revolutions. A destroyer made a speed of 26·2 knots with 359 revolutions and 3555 I.H.P. Her sister ship made exactly the same speed with 362 revolutions, but only required 3000 I.H.P., and the coal consumption in the latter case was 15 per cent. less. The superiority of the latter vessel was wholly attributed to an additional few inches in the diameter of the propeller. It has been found, also, that it is now possible to work with less apparent slip than was previously thought advisable with these fast boats, a ratio of about 8 per cent. being found advantageous, whilst with the new 30-knot boats it is anticipated this will be further reduced. Highly polished surfaces, knife edges, and thin blades at the roots, are three points well worth the attention of those having to design fast vessels. When it is remembered that with the old steel propellers running at the high speeds of rotation now common with destroyers the skin friction was estimated at about one-quarter of that due to the hulls, and even with manganese bronze propellers it may be one-seventh the friction of the hull, it will easily be seen how needful it is to pay attention to this detail.

G. R. Dunell.

CHAPTER VII.

THE NAVAL GATHERING AT KIEL.

THE opening of the North Sea and Baltic Canal afforded the Emperor of Germany an occasion for gathering the most wonderful assembly of warships that the world has ever seen. During the third week in June there lay in the harbour of Kiel representative ships of no less than fourteen different countries. Including the Royal yachts and the merchant cruisers of the North German Lloyd and Hamburg-American lines, eighty-nine ships of war were moored in the harbour. The following list, with the complements of the several ships, is taken from the official handbook.

AUSTRIA HUNGARY.

REAR-ADMIRAL ARCHDUKE KARL STEPHAN.

Armoured cruisers	Kaiserin and Konigin Maria Teresa	(415)
2nd-class cruisers	Kaiser Franz Joseph and Kaiserin Elisabeth	(367)
Torpedo gunboat	Trabant	(78)

DENMARK.

CAPTAIN N. U. GAEL.

3rd-class cruisers	Geiser and Hecla	(155)
	4 torpedo boats.	

ENGLAND.

VICE-ADMIRAL LORD WALTER KERR.

REAR-ADMIRAL A. H. ALINGTON.

1st-class battleships	Royal Sovereign, Empress of India, Resolution, Repulse	(713)
1st-class cruiser	Blenheim	(563)
1st-class cruiser	Endymion	(544)
3rd-class cruiser	Bellona	(160)
Torpedo gunboat	Speedy	(64)
Royal yacht	Osborne	(145)
Admiralty yacht	Enchantress	(80)

FRANCE.

REAR-ADMIRAL MÉNARD.

1st-class battleship	Hoche	(606)
Armoured cruiser	Dupuy de Lome	(525)
3rd-class cruiser	Surcouf	(209)

GERMANY.

Imperial yacht	Hohenzollern	(307)

ADMIRAL COMMANDING-IN-CHIEF: ADMIRAL KNORR.

Training-ship	Mars	(697)

I.—*Manœuvre Squadron.*

Division I.

VICE-ADMIRAL KOESTER.

1st-class battleships	Kurfurst Friedrich Wilhelm, Brandenburg, Wörth, Weissenburg	(556)
3rd-class cruiser	Jagd	(140)

Division II.

	Baden	(361)
2nd-class battleships	Baiern, Sachsen, Württemberg	(377)
3rd-class cruiser	Pfeil	(134)

II.—*Torpedo-Flotilla.*

3rd-class cruiser	Blitz	(134)

A. Division.

Division boat D 5 (45), and 6 torpedo boats (each 15).

B. Division.

Division boat D 4 (45), and 6 torpedo boats (each 15).

III.—*Reserve Division.*

REAR-ADMIRAL OLDEKOP.

4th-class battleships	Hildebrand, Hagen, Heimdall, Frithjof	(266)

IV.—*Training Squadron.*

REAR-ADMIRAL VON DIEDERICHS.

Corvettes	Stein (446), Stosch (446), Moltke (461), Gneisenau (461)

V.—*Sundry Ships.*

1st-class cruiser	Kaiserin Augusta	(418)
2nd-class cruiser	Gefion	(302)
3rd-class cruiser	Kaiser Adler	(150)
Despatch vessel	Meteor	(115)
Despatch vessel	Grille	(70)

VI.—*Merchant Cruisers.*

Kaiser Wilhelm II., Augusta Victoria, Columbia, Trave, Rhaetia.

ITALY.

Commander-in-Chief H.R.H. the Duke of Genoa.

Division I.

Royal Yacht	Savoia	(220)

Vice-Admiral Accinni.

1st-class battleship	Re Umberto	(664)
1st-class battleship	Andrea Doria	(506)
2nd-class cruiser	Stromboli	(310)
Torpedo gunboat	Aretusa	(105)

Division II.

Rear-Admiral Grandville

1st-class battleship	Sardegna	(673)
1st-class battleship	Ruggiero di Lauria	(478)
3rd-class cruiser	Etruria	(246)
Torpedo gunboat	Partenope	(107)

NETHERLANDS.

Captain van Waning.

2nd-class cruiser	Atjeh	(301)
3rd-class cruiser	Alkmaar	(112)

PORTUGAL.

3rd-class battleship	Vasco da Gama	(218)

ROUMANIA.

3rd-class cruiser	Elisabeta	(250)
Training-ship	Unicea	(150)

RUSSIA.

Rear-Admiral Skrydlow.

2nd-class battleship	Alexander II.	(604)
Armoured cruiser	Rurik	(524)
Armoured gunboat	Grosjatschy	(177)

SWEDEN and NORWAY.

Rear-Admiral de Klinteberg.

Coast-defence ships	Gota and Thule	(196)
Gun-vessels	Edda (75), Viking (87), Sleipner (140)	

SPAIN.

Rear-Admiral S. José Maria Heras.

1st-class battleship	Pelayo	(584)
Armoured cruiser	Infanta Maria Teresa	(484)
3rd-class cruiser	Marques de la Ensenada	

TURKEY.

Despatch boat	Fuad	

Besides ships of war there were present some 300 yachts and excursion steamers of all sizes and nationalities, and yet the harbour never had the appearance of being crowded. It is described by the correspondent of the *Times* as "a fiord of elongated and irregular shape, which runs for about five miles in a direction nearly due north and south from the town of Kiel at its southern apex to Friedrichsort on its western side, where the entrance narrows to somewhat less than a mile. The town of Kiel is situated on the western side of the harbour, the dockyard being opposite. About midway between Kiel and Friedrichsort is the entrance to the canal at Holtenau, and the harbour here grows wider, the transverse distance from Holtenau to the bay of Heikendorf being nearly two miles. The shores slope gently from the beach and are beautifully wooded and dotted here and there with villas and other buildings. The water space to within a short distance from the land affords good anchorage for large ships. There are no shoals or rocks, the bottom is good holding ground, and the depth varies from six to nine fathoms." Kiel harbour.

The principal warships were anchored in lines in the centre and on the western side, a broad sheet of open water intervening between them and the gunboats, yachts, and excursion steamers, which were allotted berths on the eastern side of the harbour. On the days when sailing was permitted small yachts could be navigated as freely as they can be in summer time in the Solent. The general scheme of arrangement was understood to have been drawn up by the Emperor himself. The organisation by which this immense concourse of ships were brought to their respective berths without confusion, and by which order was preserved in the harbour throughout the week, excited the genuine admiration of all those who were privileged to be present.

The programme of festivities commenced with a banquet given by the Senate at Hamburg on June 19th, to which the captains of all the ships present were invited. It was chiefly remarkable for the passage in the Emperor's speech, in which he spoke of peace amongst the nations: "Seas connected and did not separate, and the new connexion of two oceans which was about to be opened was an important binding tie. The mighty ironclad fleet which lay in Kiel harbour was also typical of peace and of the co-operation of all the nations of Europe in the mission of civilization intrusted to them, If they turned their eyes to the ocean of the nations, they saw that they were all looking towards these festivities as the inauguration of a work destined to serve the cause of peace."—*Times*, June 20th. Festivities.

On the 20th the Hohenzollern, followed by twenty-three vessels,

including two American liners, passed through the canal from the Elbe to Kiel. In the evening there was a crowded ball at the Marine Akademie.

On the 21st the Emperor laid the keystone of the Canal at Holtenau in the morning, reviewed the assembled fleets in the afternoon, and gave a banquet in the evening in a banqueting hall specially erected for the occasion, in the form of a fully-rigged three-decker, which was a great feature of the harbour during the fêtes. The concluding words of his speech at the banquet were as follows:—"The participation in our festivities of the Powers whose representatives we see among us, and whose splendid ships we have to-day admired, I acknowledge the more readily as I believe I am right in perceiving therein a complete vindication of the efforts we have always directed towards the maintenance of peace. Germany will range the work inaugurated to-day on the side of those accomplished in the service of peace, and will esteem herself fortunate if the Kaiser Wilhelm Canal in this sense furthers and strengthens our friendly relations to the other Powers. I drain my glass to the welfare of the friendly sovereign Powers."—*Times*, June 22nd.

Those who were present at the Kiel fêtes will certainly never forget the friendliness of the relations which existed between the officers and sailors of the German and British ships, and the cordial reception given to our officers by the populace of Hamburg on the occasion of the banquet referred to above.

Chief feature of Kiel gathering.

To the readers of the Naval Annual the most interesting feature of the gathering at Kiel was neither the brilliancy of the fêtes nor the number of ships assembled. It was the fact that it afforded an unrivalled opportunity of studying modern naval architecture, in that every country was represented by its most modern and best ships. The most formidable battleships, the fastest and the most powerful cruisers in the world—whether German or French, Russian or Austrian, English or American—took part in this splendid pageant. The battleships included four of the Royal Sovereign class, two of the Sardegna class, two of the Andrea Doria class, four of the Brandenburg class, four of the Sachsen class, the Hoche, Pelayo, and Alexander II. Of those Powers which sent battleships Russia alone might have been better represented. The gathering of cruisers was almost more remarkable than that of battleships, because it included the Russian Rurik, the American New York and Columbia, our own Blenheim and Endymion, the German Kaiserin Augusta, the Spanish Infanta Maria Teresa, and the French Dupuy de Lome. In fact every important cruiser (excepting the Elswick cruisers built for Japan, etc.) was either present or represented.

Battleships.

When looking at the modern battleships, English, French, German, and Italian, side by side as they were at Kiel, it may at once be said that the Royal Sovereign and her sisters give the impression of being ships of great sea-keeping qualities, as they are. They look like ships which would be able to fight their guns in an Atlantic gale. The Sardegna, the Brandenburg, and the Hoche do not. The vitals of the Royal Sovereign are well protected. The same remark applies to the Brandenburg and the Hoche, but not to the Sardegna, which has only a 4-in. belt at the waterline associated with a protective deck and minute cellular subdivision. The 67-ton guns of the Royal Sovereign, on the other hand, are not so well protected as the main armament of the Hoche (which is carried in closed turrets), of the Brandenburg or Sardegna (which is protected by hoods). The main armament, consisting of four guns, is mounted in pairs in two barbettes in the British and Italian ships ; in the Hoche in four separate turrets on the usual French system. The Brandenburg has six guns in her main armament mounted in three separate positions. Though these are only 11·8-in. guns as compared with the 13·5-in. guns of the Royal Sovereign and Sardegna, the German ship may be conceded to have some advantage in this respect. The secondary armament of the Sardegna is exceedingly formidable, it consists of eight 6-in. and sixteen 4·7-in. Q.-F. guns, twelve of which are mounted in the central battery and protected by 4-in. armour. That of the Hoche has been reduced in consequence of her want of stability to eight 5·5-in. quick-firers, which are mounted in an open battery and terribly exposed. That of the Brandenburg is even more feeble, viz., six 4-in. quick-firers and is equally exposed. Of the Royal Sovereign's ten 6-in. Q.-F. guns, only four are mounted in casemates, the remainder being exposed on the upper deck. The respective speeds of the four ships are: Sardegna, 19 knots ; Royal Sovereign, 17·5 ; Brandenburg, 16·5 ; Hoche, 16·0. The two former displace about 14,000 tons, as compared with about 11,000 tons, and ought therefore to be the more powerful ships. The absence of good protection at the waterline is a serious objection to the Sardegna, although many critics hold that the region of the waterline is very unlikely to be hit. The absence of adequate protection for the greater part of the secondary armament is a serious objection to a ship of the size of the Royal Sovereign, but taking all the elements of fighting efficiency into consideration as exemplified in these four modern battleships, we may on the whole be satisfied that we were represented at Kiel by the most powerful type of seagoing battleship afloat.

Cruisers.

Of the cruisers the Columbia stands in a class by herself. She

was built as a Commerce Destroyer, and her principal quality is her speed (22·8 knots on trial). She carries a very light armament in proportion to her size, and would probably fare badly in an encounter with any of the other large cruisers that were present. The Rurik, New York, and Dupuy de Lome belong to the class of armoured cruisers, in that they are protected by a belt of side armour. The Blenheim, the Endymion and the Kaiserin Augusta belong to the class of protected cruisers, in that they depend on an armoured deck.

Rurik.

The Rurik has excited very great interest in this country, and it is to the apprehensions entertained of her power that we owe the monster cruisers Terrible and Powerful. It is the impression of the writer that if we had had the opportunity of seeing the Rurik a little sooner, the Powerful and Terrible might never have been built. The Rurik possesses a tremendous armament for a cruiser; her side simply bristles with guns, and, until you get on board, she seems a most formidable ship. Once on board, that impression is removed. Four 8-in. guns, and six 4·7-in. quick-firers, are mounted on the upper deck, protected by shields, twelve of the sixteen 6-in. quick-firing guns are mounted in the main deck battery, which is absolutely open, and free from encumbrances from side to side and fore and aft, an extraordinary contrast to British ships whose battery decks are encumbered with galleys, etc. A single shell exploding in the Rurik's open battery might put half-a-dozen guns out of action at once. Two 8-in. and four 6-in. guns are available for bow and stern fire. The Rurik is heavily rigged as a barque, a serious disadvantage to a ship of such good speed and engine power. The speed is 18 knots.

Dupuy de Lome.

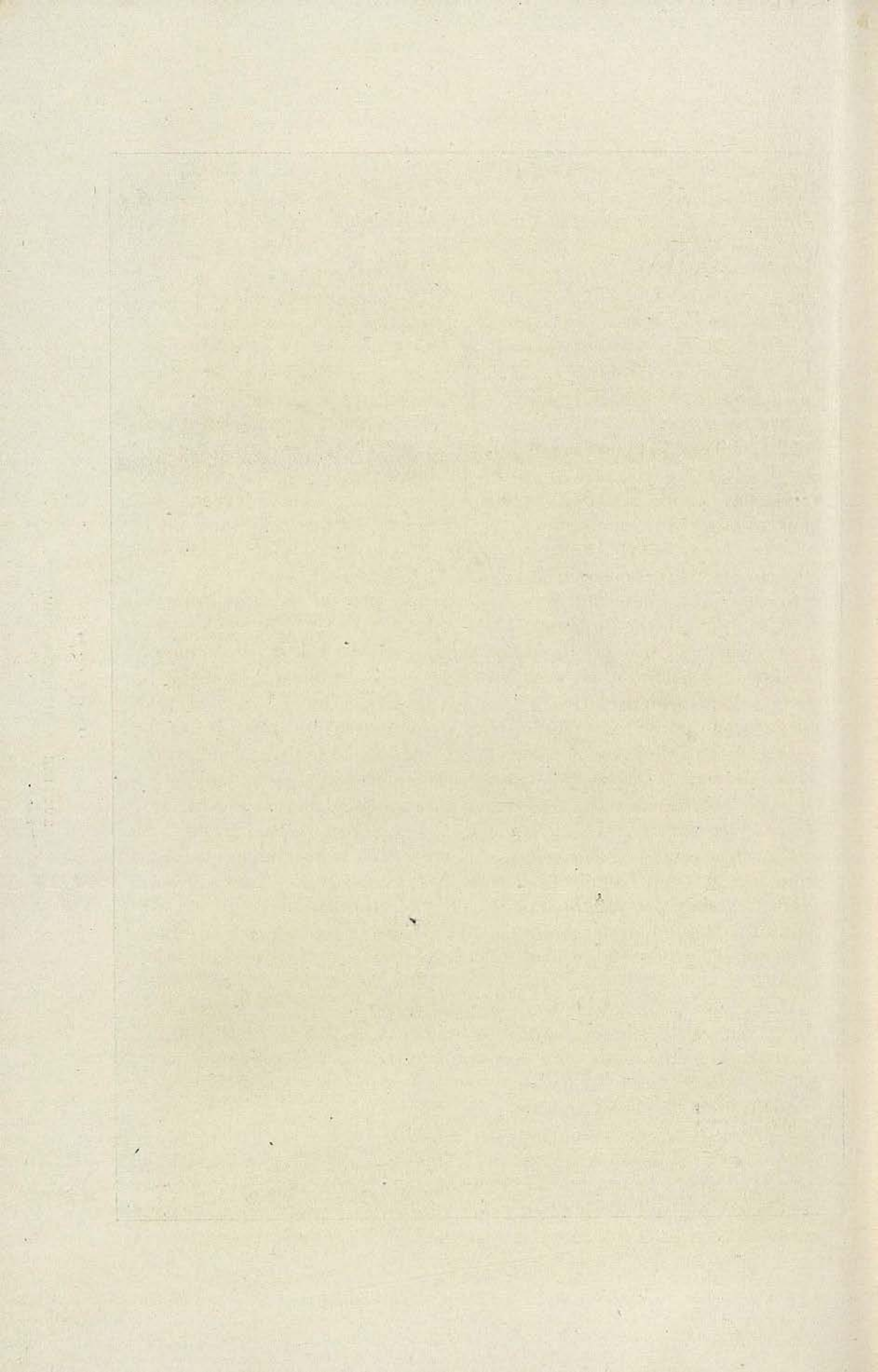
The Dupuy de Lome is not much more than half the size of the Rurik, and she only carries two 19 cm. (7·4-in.) guns and six 16 cm. (6·2-in.) quick-firers. On the other hand, the hull is completely covered with 4-in. plates up to the level of the upper deck, and each gun is mounted in a separate turret protected by 4-in. armour. In theory, both 7·4-in guns, and three 6·2-in guns, can fire ahead or astern, but in practice it would be impossible to fire the 7·4-in. guns in line with the keel without seriously damaging the upper works. The three turrets for the 6·2-in. guns aft are on the same level and very much crowded together. The speed is 20 knots. She is said by her officers to behave well at sea.

New York.

The New York has a displacement of 8,500 tons, about midway between that of the Rurik and that of the Dupuy de Lome. She is protected by a 4-in. belt at the water-line, and by a deck 6 inches thick on the slopes. The armament consists of six 8-in. guns and and twelve 4-in. quick-firers. Four of the 8-in. guns are mounted

"RURIK,"

RUSSIAN ARMOURED CRUISER.



in pairs in turrets protected by 10-in. armour on the American double-wall system, the remaining two are mounted en barbette amidships. All the 8-in. guns are on the upper deck. The 4-in. guns are distributed at wide intervals along the main deck, 4-in. armour being worked into the side of the ships in front of each gun. In theory four 8-in. guns and four 4-in. guns can be fired either ahead or astern. The speed of the New York is 21 knots.

The Austrian cruiser, Kaiserin Maria Teresa, is a powerful vessel for her size (5,270 tons). She is protected amidships by a belt of 4-in armour, at the ends of which the plating is carried up to the upper deck, and there are 4-in. transverse bulkheads. The armament includes two 9·4-in. guns mounted in turrets, which are protected by 4-in. armour, on the upper deck, and eight 5·9-in. quick-firing guns, two being mounted on the upper deck on each broadside, the four others being mounted on the main deck just forward and abaft of the larger guns, and protected by the 4-in. plating already referred to. The speed is 19 knots. The two other Austrian cruisers are small editions of the Maria Teresa, but have no belt and only six 5·9-in. quick-firing guns instead of eight. Maria Teresa.

The Spanish armoured cruiser, Infanta Maria Teresa, is similar in design to the Aurora class of the British navy, though of somewhat larger displacement. Her vitals are protected by a 12-in. belt at the water-line. Two 11-in. guns are mounted in turrets, one at either end of the ship, protected by 10·5-in. armour. Ten 5·5-in. guns are carried on the upper deck. The fact that these guns are not quick-firers places her at a serious disadvantage compared with the vessels already described. The speed is 20 knots. Infanta Maria Teresa.

The Kaiserin Augusta has no armour on the side or over the guns. She has a 3-in. deck. The armament consists of twelve 5·9-in. guns, two of these mounted right aft, two others in the very eyes of the ship, the remainder being mounted close together in the waist The speed is 20 knots, though she is said to have done more on her trials. Kaiserin Augusta.

In recent years we have discarded belt protection for cruisers and have put our faith in a stout protective deck with deeply inclined sides. The Blenheim and Endymion carry no side armour. The former has a deck of a maximum thickness of 6 inches, the latter of 5 inches, on the slope amidships in way of the engines and boilers. This deck is 3 inches thick on the horizontal portion in the former and 1 inch thick in the latter. Both ships carry the same armament, viz., two 9·2-in. guns mounted behind shields on the poop and forecastle and ten 6-in. quick-firing guns, four of which are mounted in 6-in. casemates on the main deck, and six on the upper deck. The Blenheim and Endymion.

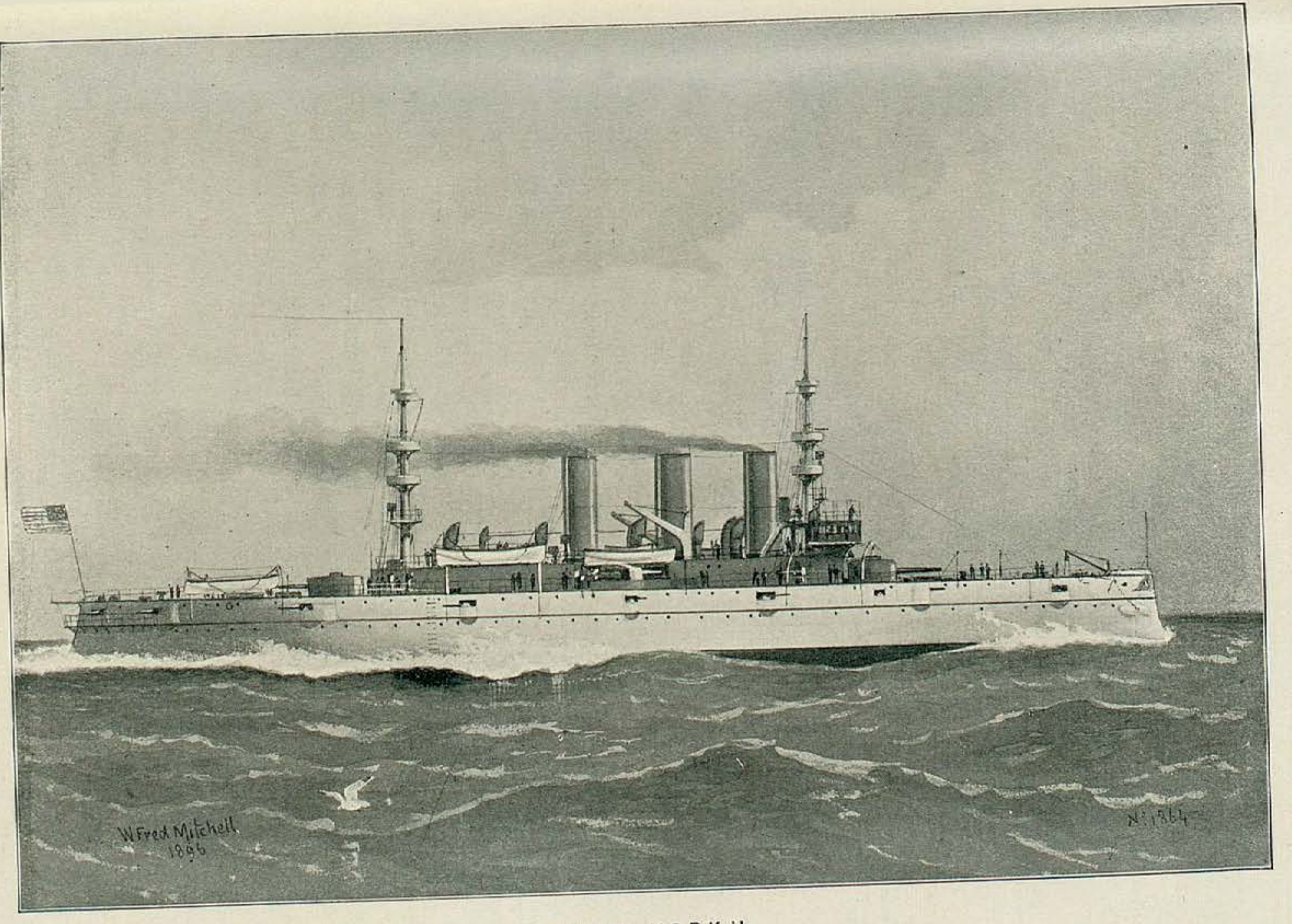
guns are well distributed and do not hamper one another's fire. The speed of the Blenheim is 21 knots, of the Endymion 20 knots. M. Weyl, writing in the *Yacht* of the 6th July, says that neither ship attracted the attention of the experts who were at Kiel. This is probably due to the fact that they were not so new as many other ships which were present, and that their qualities were well known.

Respective merits of cruisers.

It is exceedingly difficult, in the absence of the experience of actual warfare, to form an estimate of the respective merits of the various cruisers which have been described. The present writer took the opportunity of visiting them all, with the exception of the Austrian and Spanish ships, and on the whole is inclined to think that the Blenheim and Endymion held their own amongst the cruisers at Kiel. The New York is a powerful ship in many respects. Her vitals are well protected, and the armament is so well distributed that it is hardly conceivable that a single shot could put more than two guns out of action. The larger guns are protected by thicker armour than those of any ship, and the whôle armament, except the light quick-firing pieces, has some armour protection. On the other hand, the total energy of fire per minute * is only 119,904 ft. tons or 14·1 ft. tons per ton of displacement, and compares unfavourably with that of the British cruisers, the Rurik, or the Dupuy de Lome. Like our own cruisers, the New York has every appearance of being able to well maintain her speed in a sea-way. The Dupuy de Lome, owing to the complete protection afforded to her hull and armament, would undoubtedly be a very ugly customer for any cruiser to tackle, and there were many people who thought she was a more formidable ship than the New York. The Rurik, in spite of her tremendous armament, is, for the reasons already given, exceedingly vulnerable. The Blenheim, with her three knots superiority in speed, which should enable her to avoid the Rurik's terrible broadside, should have a better chance of success against the Rurik than against the Dupuy de Lome. Two Endymions would be a more valuable addition to the British navy than one Rurik. Though, perhaps, it is not possible to say with the same confidence of the British cruisers as we did of the British battleships, that they were the most powerful vessels of their class at Kiel, they were, at any rate, worthy representatives of British Naval Architecture.

T. A. Brassey.

* The method of calculating this and the energies of fire per minute for ships now building will be found in following chapter, p. 144, *et seq.*



"NEW YORK,"

UNITED STATES ARMOURED CRUISER.

CHAPTER VIII.

British and Foreign Warship Construction.

I.—*Battleships.*

Before discussing any features of construction peculiar to our own new ships or those of foreign nations, it may be interesting to note those which have been adopted in late years in the vessels of all the leading Powers, and it is due to Sir William White to call attention to the extent to which the type of battleship brought forward in 1889 has been copied abroad. The newest armoured line of battleship of England, France, Russia, and the United States, has an armament consisting of certain heavy armour-piercing guns, generally four in number, placed in commanding positions, and between them a powerful secondary battery of quick-fire pieces. The armour in all cases consists of a thick belt and heavy vertical armour for the primary guns. This is combined with an armoured deck and supplemented by thinner side armour to protect the secondary guns. These features are found in the English Majestic class, in the French Charlemagne, the Italian St. Bon, the Russian Poltava and Sissoi Veliky, and the new United States battleships, so that they may be said to characterize the most approved type of battleship of the present day. The combination is interesting as involving more than at first appears. The design is of a duplicate character and entails two kinds of fighting being carried on, which are as distinct from each other as the action of artillery and infantry in the field. The primary armaments behind their thick shields will generally either engage each other or conduct what is called "*Belt attack*," that is, the attack of the vital parts of the enemy by means of shot or other armour-piercing projectiles of the strongest kind. The secondary batteries, on the other hand, are generally incapable of performing this work, and will be devoted to "*Shell attack*," that is, they will attack each other or the lighter structural parts, such as the conning tower. A great part of their fire will certainly be delivered with shells, although the increased use of medium or thinner armour may call for a projectile in which bursting charge is in a measure sacrificed

Similarity of recent types.

for the sake of structural strength, termed an "armour-piercing shell."

Energy of fire.

One peculiarity in the arrangement is that while the quick-fire pieces are incapable of striking blows comparable with those of the primary guns, their rate of delivery is so great that in any given time their total energy of fire is out of all proportion to that of the heavy guns. For example, it will be seen in the table following that the relative total energies of fire of the primary and secondary armaments per minute, in the Majestic class, are 101,820 and 292,100 foot tons. Indeed, for many purposes in war, the ships would depend mainly upon their secondary fire with its wide distribution and great number of blows. It is scarcely possible then to conceive a greater contrast than is found by comparing this type with such a ship as the old Inflexible or Dreadnought with only four heavy guns. For close fighting, however, with an adversary who is about their match, the value of the primary guns may be seen in the annexed diagram A. The two upper circles show the powers of the Royal Sovereign and Majestic classes. The ship is supposed to have concentric circles described at each 500 yards' interval round her up to 3,000 yards. The fire of each of her guns is represented by a sector of 10 degrees: this is only to indicate the number of pieces, not their lateral scope. Power of perforation through iron is marked at each circle, and to enable the eye to take in the conditions more readily, shading is used, dark in proportion to this thickness of armour which may be perforated. Thus it can be seen at a glance that the 6-in. Q.-F. guns perforate only very thin plates compared with the 67-ton guns, and much more so, compared with the 12-in. wire guns of the Majestic class. Even at 3,000 yards, the Royal Sovereign's primary guns can perforate 24·7 inches of iron, and her own side armour is only equivalent to 22·5 inches. On actual service, "belt attack" would probably take place at a much closer range, so that belt perforation might be effected, making all allowance for obliquity of impact, with the heavy guns, though never possible for the 6-in. Q.-F. pieces. On the other hand, while these would expend their shells in vain against the belt of a powerful adversary, the heavy guns would be unprofitably employed, if they delivered their few tremendous blows against the lighter structural parts where they would very likely produce little more effect than a smaller projectile; that is to say while each large shell would doubtless destroy a larger zone and would do so more completely than a small shell, in most cases little more effect would be produced on the fighting power of the adversary by a heavy shell entering the lighter structure than by a light shell. It follows then that the duplicate character of the

DIAGRAM A.

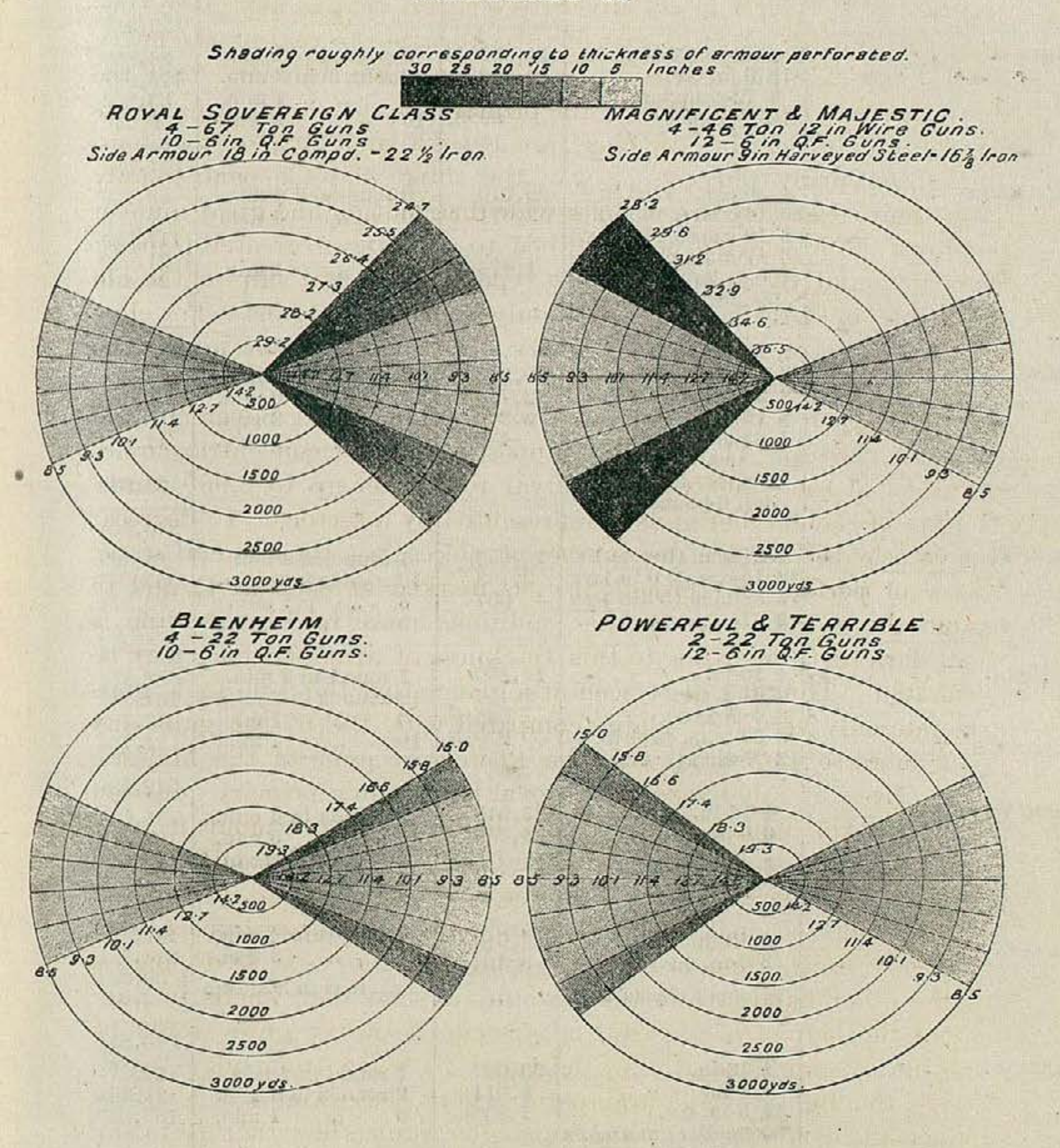

Shading roughly corresponding to thickness of armour perforated.
30 25 20 15 10 5 Inches
ROYAL SOVEREIGN CLASS
4 – 67 Ton Guns
10 – 6 in Q.F. Guns
Side Armour 18 in Compd. – 22½ Iron
24·7
25·5
26·4
27·3
28·2
29·2
14·2 12·7 11·4 10·1 9·3 8·5
500
1000
1500
2000
2500
3000 yds
MAGNIFICENT & MAJESTIC.
4 – 46 Ton 12 in Wire Guns.
12 – 6 in Q.F. Guns.
Side Armour 9in Harveyed Steel – 16⅞ Iron
28·2
29·6
31·2
32·9
34·6
36·5
8·5 9·3 10·1 11·4 12·7 14·2
500
1000
1500
2000
2500
3000 yds
BLENHEIM
4 – 22 Ton Guns.
10 – 6 in Q.F. Guns.
15·0
15·8
16·6
17·4
18·3
19·3
14·2 12·7 11·4 10·1 9·3 8·5
500
1000
1500
2000
2500
3000 yds.
POWERFUL & TERRIBLE.
2 – 22 Ton Guns
12 – 6 in Q.F. Guns
15·0
15·8
16·6
17·4
18·3
19·3
8·5 9·3 10·1 11·4 12·7 14·2
500
1000
1500
2000
2500
3000 yds.

TABLE showing Armaments of Battleships and Estimated Rates of Fire.

Name of Vessel.	Armament.	Muzzle energy per gun.	No. of rounds per gun.	Total energy of fire of each class of gun per minute.
		Foot-tons.		Foot-tons.
MAJESTIC and MAGNIFICENT	4 12-in. 46-ton(wire)	33,940	3 ,, 4 min.	101,820
	12 6-in. Q.F.	3,356	16 ,, 3 min.	214,784
	16 12-pounder Q.F.	425	10 ,, 1 min.	67,680
	12 3-pounder Q.F.	80·3		9,636
				393,920
RENOWN	4 10-in. 29-ton	14,430	1 round in 2 min.	28,860
	10 6-in. Q.F.	3,356	16 rounds in 3 min.	178,987
	8 12-pounders	423	10 ,, 1 min.	33,840
	12 3-pounders	80·3	10 ,, 1 min.	9,636
				251,323
CHARLEMAGNE . . .	4 30-c.m. (11·8 in.)	29,910	3 rounds in 4 min.	89,730
	10 14-c.m. (5·5 in.)	3,371	16 ,, 3 min.	179,792
	8 10-c.m.(3.9 in.)Q.F.	1,474	10 ,, 1 min.	117,920
	16 47 m.m. Q.F.			21,600
	14 Q.F. taken as 3-pounders			10,680
				419,722
CARNOT	2 30-c.m. (11·8 in.)	29,910	3 rounds in 4 min.	44,865
	2 27-c.m. (10·8 in.)	22,750	1 ,, 2 min.	22,750
	8 14-c.m.(5·5 in.)Q.F.	3,371	16 ,, 3 min.	143,829
	4 65-m.m. (2·5 in.)	432	10 ,, 1 min.	17,280
	18 smaller guns, suppose half 3 and half 6-pounders		..	24,840
				253,564
ERSATZ PREUSSEN . .	4 24-c.m. (9·4 in.)	14,050	1 round in 2 min.	28,100
	18 15-c.m.(5·9 in.) Q.F.	3,703	16 rounds in 3 min.	355,488
	12 88-m.m.(3·5 in.) Q.F.	857	8 ,, per min.	82,272
	12 37-m.m. Q.F.			
				465,860
†ST. BON	4 10-in.	14,430	1 round in 2 min.	28,860
	8 6-in. Q.F.	2,457	16 rounds in 3 min.	104,832
	8 4·7 Q.F.	995·4	6 ,, 1 min.	47,779
	8 57-m.m. (2·4 in.)	279·5	10 ,, 1 min.	44,720
	12 37-m.m.(1·4 in.)			
				226,191
*SISSOI VELIKY . .	4 12-in.	33,940	3 rounds in 4 min.	101,820
	6 6-in.	3,356	16 ,, 5 min.	107,392
	28 smaller pieces	..	Taken as those of Majestic	77,316
				286,528
*POLTAVA . . .	4 12-in.	33,940	3 rounds in 4 min.	101,820
	12 6-in. Q.F.	3,356	16 ,, 3 min.	214,781
	24 smaller pieces	..	Taken as in Majestic	59,220
				8,030
				383,851
KEARSAGE. . . .	4 13-in.	33,627	1 round in 2 min.	67,254
	4 8-in.	8,011	2 rounds in 3 min.	21,363
	14 5-in. Q.F.	1,834	6 ,, 1 min.	153,856
	30 smaller guns taken as English 6 and 3 pounders	..	..	41,400
				283,873

Note.—The rates are assumed to be the same as the British, and the 47-m.m. gun is taken as equivalent to the British 3-pounder Q.F. The 14-c.m. Canet is taken as the new 45-calibre gun, and the 10-c.m. as the new 50-calibre gun.

* In the certainty that much more powerful guns than at present shown in the Tables of Ordnance will be carried by these ships, the pieces have been credited with the same power as British guns of the same calibre. Wire-guns are adopted in Russia, and it will be seen in the attack of the Carnegie plate a velocity of nearly 2,900 f.s. was employed. English energies and rates of fire are used in default of the Russian ones.

† The St. Bon is credited with 10-inch guns of equal power to the British guns.

Diagram B.—BATTLESHIPS.

Showing the estimated total energy of fire that can be discharged per minute. The actual amounts of energy are given in figures, and their relative powers are seen at a glance by the area of the rectangles.

Ship	Energy of fire
MAJESTIC and MAGNIFICENT. 14,900 Tons.	393,920 Foot Tons. 26·4 per Ton Displacement.
RENOWN. 12,350 Tons.	251,323 Foot Tons. 20·4 per Ton Displacement.
CHARLEMAGNE. 11,000 Tons.	419,722 Foot Tons. 38·1 per Ton Displacement.
CARNOT. 12,000 Tons.	253,564 Foot Tons. 21·1 per Ton Displacement.
ERSATZ PREUSSEN. 10,826 Tons.	465,860 Foot Tons. 43·0 per Ton Displacement.
ST. BON. 9,800 Ton	226,191 Foot Tons. 23·1 per Ton Displacement.
SISSOI VELIKY. 8,880 Tons.	286,528 Foot Tons. 32·3 per Ton Displacement.
POLTAVA. 11,000 Tons.	383,851 Foot Tons. 34·9 per Ton Displacement.
KEARSAGE. 11,500 Tons.	283,873 Foot Tons. 24·7 per Ton Displacement.

present type of warship extends to armament, armour, and the part played in action. This state of things did not exist in the days of wooden ships. It did not exist in the earlier ironclads. It began perhaps to be hinted at in the Duperré and Shannon, but in its pronounced features it has hardly shown itself in any naval action yet. It is, however, the dominant characteristic of the modern battleship of all the leading naval Powers and it deserves special notice.

Battleships building. The newest types of battleships now under construction for our own and foreign navies are represented by the Majestic and Renown, the French Carnot and Charlemagne, the Russian Poltava and Sissoi Veliky, the United States Kearsage, and the Italian Admiral St. Bon. The two battleships building in England for Japan are to a great extent reproductions of the Royal Sovereign, and as far as we know present no new features of interest.

Protection. There is much similarity in the design of all the newest battleships, but the differences are considerable though perhaps of secondary importance. The peculiar features of the Majestic class are as follows. The side belt armour is reduced to 9 inches in thickness, which is equal to 16⅞ inches of iron, though recent trials seem to suggest that it may before long be made equal to more than 18 inches of iron. This is reinforced by a second defence in the bending down of the armour-deck so as to meet the lower edge of the belt. Though repeatedly described, the exact object of this has hardly been made clear. While it is unquestionably preferable to keep a projectile from penetrating the vertical armour-belt, only a very thick belt indeed would be equivalent to the double wall above described, for any projectile perforating the belt would be probably more or less broken or deflected, and in this condition could effect nothing serious against the sloping 4-in. deck which it would encounter at a very oblique angle. The Carnot and Charlemagne are protected at the water-line like all other French battleships by a complete belt, 17¾ to 10¾ inches thick in the former, 15¾ to 9¾ inches thick in the latter. In both cases the maximum thickness only extends in way of the engines and boilers at the water-line, tapering towards the lower edge and towards both extremities of the ship. The Italians have adopted for the St. Bon the complete belt of the French, the Russians in the Sissoi Veliky the partial belt of British design. The Sissoi Veliky's and Poltava's belts are 15¾ inches thick. In the Kearsage the belt varies from 16½ to 9½ inches in thickness between the two turrets, and is continued to the bows with a thickness of 4 inches. All these foreign ships have an armoured deck 3½ to 3 inches in thickness, but in no case can the deck be considered a

substitute for side-armour in the same way as it is in the Majestic. In both British and foreign ships the water-line protection is about the same in thickness. It will need the test of actual warfare to settle definitely whether the system of dividing that protection into two parts, as has been done in the Majestic, or the system generally adopted abroad, is the better.

In the Majestic, the 9-in. armour has a depth of 15 feet, and is carried up to the level of the main deck. In the French, Italian, Russian, and American ships, the thick belt armour is less than half this depth, but the side is covered with armour about 6 inches thick, also up to the level of the main deck, except in the French ships, where there is the old, weak, unarmoured space above the belt extending as completely round the ship as the belt itself. All the newest war ships building for our own and foreign navies may be fairly described as side-armoured, in contradiction to the term belted, which is applicable to the French ships. Area of side armour.

It is very curious that the French, who have taken the lead in experiments with shells, "à grande capacité d'explosif," have not in their recent designs made better provision for preventing such shells from bursting in the interior of the ship. This may be because such shells have shown a tendency to explode spontaneously, and because the French have perhaps come to the conclusion that the risk of carrying them on board ship is too great, and is not likely to be run in actual war. In a recent article in the *Yacht*, on the influence of the improvement in projectiles in the designs of ships of war, the terrible effects of shell charged with melinite, or other higher explosives, as shown by the experiments on the Resistance (already alluded to), and the Belliqueuse, and at the Polygone de Gâvres, is thus described:—"Tout ce qui se trouve dans le voisinage de l'explosion est entièrement détruit, des milliers de morceaux de fer sont projetés dans tous les sens, avec une vitesse énorme, et traversent les ponts et les cloisons. Lorsque l'explosion a lieu au-dessus du pont blindé ce dernier est défoncé sur une grande surface, et ses débris formant projectiles détruisent tout ce qui se trouve au-dessous d'eux dans l'intérieur. En plus de ces effets mécaniques, les vapeurs nitreuses et l'oxyde de carbone produits rendent l'air absolument irrespirable pendant longtemps." High explosives.

The principal armament* consists in each case of four heavy guns of about the same calibre, mounted in pairs in two positions on the centre line of the ship, except in the Carnot, where the usual French method has been adhered to of mounting the guns in four separate Main armament.

* The armaments and energies of fire of the battleships under discussion are given on pp. 144, 145.

positions: two on the centre line of the ship forward and aft, and two on the broadside amidships. The Renown and St. Bon carry only 10-in. guns for their principal armament. It is worthy of remark that the 12-in. 46-ton wire gun of the Majestic has a penetration equal to that of the 110-ton guns of the Benbow and Sans Pareil. The protection afforded to the main armament is much the same in each case, the thickness of the barbette or turret armour varying only from 16 inches in the Charlemagne to 10 inches in the Renown and St. Bon. France and other Powers have followed our example and greatly strengthened the protection afforded to the bases of their turrets on the lines of our redoubt system. The barbette has practically become a closed turret, owing to the stout hood which covers the breech of the guns.

Secondary armament.

The systems adopted for protecting the secondary armament differ very considerably. In the Majestic class and the Renown the casemates of the Royal Sovereign are employed in increased numbers. Each gun is enclosed in a separate chamber protected by 6-in. Harveyed steel in front and by 2-in. steel on the sides. The system of thus isolating each gun and protecting it from the gas generated by and the fragments of shells burst in the hull of the vessel, owes its origin to the experiments alluded to above. In the Carnot the secondary armament is similarly isolated and is carried in eight turrets of 4-in. armour. In the other ships under consideration the secondary armament either wholly or in great part is carried in a battery on the upper deck covered with light armour, 3 inches thick in the case of the Charlemagne, 4 inches to 5 inches thick in the other vessels. In the Charlemagne and Kearsage, and presumably in the other vessels, splinter bulkheads will be worked between each gun. Though possibly the protection afforded to each gun may not be quite as complete in the latter system as in the turret or casemate system, it is certainly a very great advantage to exclude all lighter projectiles and shell from the battery deck, and the guns themselves are very much better protected in rear.

Distribution of armament.

The secondary armament is better distributed in the Majestic than in any of the foreign ships—four 6-in. guns in casemates on each side on the main deck, two on each side on the upper deck, the casemates of the latter protecting the 12-pounders between them from raking fire. The fire of the guns does not interfere with one another. The same cannot be said of the Carnot. Here the 5·5-in. are grouped in pairs round each of the larger guns. The large guns on the broadside, if fired nearly ahead or astern, as in theory they can be, would fire over the turrets of the 5·5-in. guns, probably with disastrous results. In the Charlemagne eight of the ten 5·5-in. guns are mounted in a bat-

tery protected by only 3-in. armour. A single shell exploded in this battery might put several of the guns out of action at once. The other two 5·5-in. guns are exposed on the flying deck. The double turret of the Kearsage is a feature peculiar to these ships, though it has a counterpart in the forward and after casemates of the Powerful which are situated one immediately over the other. A single lucky shot would put two 8-in. and two 13-in. guns out of action. It is open to the further objection, as pointed out in a previous chapter by M. Weyl, that as all four guns must be moved horizontally together, all four shots might be wasted. The system of protection for the 5-in. Q.-F. guns has, as already said, much to commend it. The 6-in. Q.-F. guns of the St. Bon and Sissoi Veliky are mounted in a redoubt protected by 4-in. armour in the former and 5-in. armour in the latter, but we do not know that screens are to be provided between the guns. The 4·7-in. guns of the St. Bon are well distributed in the flying deck, but are only protected by shields.

Speed. Of recent years our battleships have had considerable superiority in speed, but the newest French and German ships and the St. Bon are to have a trial speed of 18 knots, as compared with 17·5 knots in the Majestic class, though in a sea way our ships will very possibly be the faster. The Kearsage and Sissoi Veliky are only designed to steam 16 knots. Speed in their case has been sacrificed to powers of offence and defence. The Renown steams 18 knots. It is satisfactory to know that the improved Renowns to be laid down in 1896–7 will have a speed of 18 to 18½ knots.

Sea-keeping qualities. In general sea-keeping qualities, in amount of coal and stores carried, and in seaworthiness, our ships are unrivalled. In habitability they may be surpassed by the Carnot, but, as has been pointed out in the *Yacht*, and as is apparent from the picture of the ship,* the unprotected portion of the hull, with its three tiers of ports, would offer an immense target, and must inevitably be destroyed in an action. The débris might paralyse the action of the turrets. Life would be impossible on board until the superstructure had been repaired, and the services of the ship would be lost to the country while this was being done.

Cruisers. To pass on to cruisers. If the battleships at present under construction resemble each other in their most important features, the same cannot be said of the cruisers, in which the objects sought and the consequent features of the vessels differ very widely indeed. In four respects, however, all agree, viz.: in the presence of some form of armoured protection, in the adoption of quick-firing guns, in unpre-

* *Cf.* plate 44.

cedented coal-carrying capacity, and in high speed; while the powers of attack, however extensive, are all of the second order and calculated for fighting cruisers and not heavily-clad ships. The leading naval Powers have all concurred in adopting a vessel possessing these features, and consequently of an entirely different character to the cruiser of former times—that is to say, a vessel of very great displacement, in some instances rivalling that of the largest battleships. These large cruisers may be divided into two main classes according to the purpose for which they are intended.

Commerce destroyers

The first class is intended for the destruction of commerce. The American commerce destroyers, Minneapolis and Columbia, have been considered in the last chapter. Two commerce destroyers, the Chateau Renault and Guichen, are building for the French Navy of about the same displacement as the Columbia, viz., 8,000 tons, and with the same high trial speed of 23 knots. They carry a light armament in proportion to their size, and would be quite unable to cope with the cruisers belonging to the second class.

First-class cruisers.

The second class are intended to fight and not to run away if they meet other cruisers. With the exception of the British cruisers all carry a belt of side armour at the water-line. The Powerful and Andromeda class, like their predecessors, depend upon a deeply inclined armoured deck for the protection of the vitals of the ship. British naval constructors have held that this form of protection is more efficacious than a belt of armour on the side, and though our cruisers are technically known as "protected," while the foreign vessels in the table are called "armoured," they may fairly be considered to belong to the same class.

Most armoured cruisers have some protection for the armament. In the Powerful and the Andromeda the 6-in. Q.-F. are carried in casemates, in the Brooklyn the 8-in. guns are mounted in four barbettes protected by 8-in. armour in front and 4-in. armour in rear, the 5-in. Q.-F. armament is protected, as in the New York, by 4-in. armour. In the Esmeralda and Rossia the guns have no other protection than that afforded by stout shields. We have not as yet full information as to the Jeanne d'Arc's design. In the new Italian cruisers, Carlo Alberto, etc., a large area of side is protected by 6-in. armour.

Armament.

A comparison of the rectangles (p. 153) showing the total energy of fire delivered per minute given in the table (p. 152) will show at a glance which cruiser has the superiority in this respect. The Powerful and Terrible, in spite of their enormous size, do not come out very well. The 9·2-in. guns which they carry on the quarter deck and forecastle are too large for fighting cruisers and are not large

enough for the attack of heavily armoured vessels. Two 8-in. quick-firers would have given them very much greater energy of fire per minute, though there would possibly not be any saving in weight, if the supply of ammunition as well as the weight of gun and gun carriage, is taken into consideration. The armament of the Andromeda and her sister ships seems almost as effective. The Rossia carries a very powerful armament and if, as is very possible, 8-in. quick-firers are substituted for the 8-in. B.L. guns with which she is at present credited, the energy of fire per minute will be largely increased. Whether this be the case or not, it is certain that the Rossia will find her match in either the Powerful or the Andromeda, unless her guns are mounted and distributed on a very different system to that of her prototype, the Rurik. The Jeanne d'Arc, which is of about the same size as the Andromeda, has a slightly less powerful armament; and we have as yet no information as to how it is to be distributed or protected. The Carlos V. and Brooklyn, which are 2,000 tons smaller, carry an armament in proportion to their size; the same criticism as was applied to the Powerful may be applied to the Carlos V. with increased force. Two 11-in. guns are not in their proper place in a cruiser intended to fight cruisers.

The fastest of these cruisers is the Jeanne d'Arc with an estimated speed of 23 knots. The Powerful has a speed of 22 knots. The other vessels a speed of from 20 to 21 knots. Speed.

The Powerful carries coal estimated to be sufficient to run 25,000 knots at 10 knots, or a great circle round the world. The Russia and the Jeanne d'Arc carry coal to run 20,000 and 15,000 knots respectively. The main idea of these ships is apparently independence of supplies and high speed, coupled with the measure of offensive and defensive power that is considered necessary for cruiser warfare. Coal supply.

In sharp contrast to the above, is a type of cruiser which has latterly been built at Elswick for the Argentine Republic, Chili, and Japan. In the Esmeralda, with about half the displacement of the largest British cruisers, is combined equal speed, an alternative system of protection, claiming to be as good, and an enormous superiority of fire. The coal capacity is necessarily very much less, the purpose of the ship being fighting power rather than independence of supply. The design is, in fact, the masterly embodiment of the Elswick principle of keeping power of offence as the main object of attainment. England undoubtedly requires cruisers capable of performing the longest runs, and this quality she has secured in her large new types, but it may be questioned whether it is not an exceptional requirement to run 25,000 miles (as above said, a great circle of the world), and whether we can afford to dispense with vessels of the Elswick Elswick cruisers.

TABLE showing Armaments of Cruisers, and Estimated Rates of Fire.

Name of Vessel.	Armament.	Muzzle energy per gun.	No. of rounds per gun.	Total energy of fire of each class of gun per minute.
		Foot-tons.		Foot-tons.
POWERFUL and TERRIBLE	2 9·2-in. 22-ton	10,910	2 rounds in 3 min.	14,547
	12 6-in. Q.F.	3,356	16 ,, 3 min.	214,784
	16 12-pounder Q.F.	423	10 ,, 1 min.	67,680
	12 3-pounder Q.F.	80·3		9,636
				306,647
JEANNE D'ARC	2 19-c.m. (7·5 in.)	7,894	1 round in 1 min.	15,788
	8 14-c.m. (5·5 in.) Q.F.	3,371	6 rounds in 1 min.	161,808
	12 10-c.m. (3·9 in.) Q.F.	1,474	6½ ,, ,,	114,972
	16 47-m.m.	91·7	10 ,, ,,	14,672
	8 37-m.m.			
				307,240
CARLO ALBERTO	12 6-in. Q.F.	3,356	16 rounds in 3 min.	214,784
	6 4·7-in. Q.F.	995·4	6 rounds in 1 min.	35,834
	2 75-m.m. Q.F.	419·5	10 ,, 1 min.	8,390
	10 2·2-in. Q.F.	279·5	10 ,, 1 min.	27,950
	10 1·4-in.			
				276,958
*ROSSIA	4 8-in.	4,943	2 ,, 3 min.*	13,181
	16 6-in. Q.F.	3,356	16 ,, 3 min.	286,379
	6 4·7-in. Q.F.	2,061	6 ,, 1 min.	74,196
	36 smaller Q.F.	423	10 ,, 1 min.	84,600
	taken as 20 12-pr.	80·3		12,848
	,, 16 3-pr.			
				471,204
BROOKLYN	8 8-in.	8,011	1 round in 1 min.	64,088
	15 5-in. Q.F.	1,834	6 rounds in 1 min.	165,060
	12 6-pounders, Q.F.	156·6	10 ,, ,,	18,792
	4 1-pounders, Q.F.			
				247,940
ARROGANT	4 6-in. Q.F.	3,356	16 rounds in 3 min.	71,595
	6 4·7 Q.F.	995·4	6 ,, 1 min.	35,834
	8 12-pounders	423	10 ,, 1 min.	33,840
	1 12-pounder (8 cwt.)	223·8		22,238
	3 3-pounders	80·3		2,409
				145,916
CATINAT	4 16-c.m. (6·3 in.) Q.F.	4,632	5 rounds in 1 min.	92,640
	10 10-c.m. (3·9 in.) Q.F.	1,172	8 ,, 1 min.	93,760
	14 47-m.m. (1·9 in.) Q.F.	80.3	10 ,, 1 min.	11,242
	4 37-m.m.			
				197,642
BUENOS AIRES	2 8-in. (45 cal.) Q.F.	10,300	4 rounds in 1 min.	82,400
	4 6-in. (45 cal.) Q.F.	4,688	16 ,, 3 min.	100,011
	6 4·7-in. (45 cal.) Q.F.	2,061	8 ,, 1 min.	98,928
	12 3-pounder Q.F.	91·7	10 ,, 1 min.	11,004
				292,343

* In the certainty that much more powerful guns than at present shown in the Tables of Ordnance will be carried by these ships, the pieces have been credited with the same power as British guns of the same calibre. Wire-guns are adopted in Russia, and it will be seen in the attack of the Carnegie plate a velocity of nearly 2,900 f.s. was employed. English energies and rates of fire are used in default of the Russian ones.

DIAGRAM B.—CRUISERS.

Showing the estimated energy of fire that can be discharged per minute.

POWERFUL and TERRIBLE. 14,200 Tons.	306,647 Foot Tons. 21·6 per Ton Displacement.
JEANNE D'ARC. 11,000 Tons.	307,240 Foot Tons. 27·9 per Ton Displacement.
CARLO ALBERTO. 6,500 Tons.	276,958 Foot Tons. 41·1 per Ton Displacement.
ROSSIA. 12,130 Tons.	471,204 Foot Tons. 38·8 per Ton Displacement.
BROOKLYN. 9,250 Tons.	247,940 Foot Tons. 26·8 per Ton Displacement.
ARROGANT. 5,800 Tons.	145,916 Foot Tons. 25·2 per Ton Displacement.
CATINAT. 3,998 Tons.	197,642 Foot Tons. 49·4 per Ton Displacement.
Elswick Cruiser, BUENOS AIRES. 4,500 Tons.	292,343 Foot Tons. 65.0 per Ton Displacement.
Elswick Cruiser. ESMERALDA.* 7,000 Tons.	509,091 Foot Tons. 72·7 per Ton Displacement.

* The armament of Esmeralda comprises 2 8-in., 16 6-in., 8 12-pr., and 10 6-pr., all Q.F.

type. A less striking change of armament than the introduction of quick-firing guns has before now produced startling effects in war. In 1796, the first Glatton, with a new armament of carronades, beat off four French ships who attacked her, sinking one of them by the unexpected power of the fire delivered at close range by her carronades. A cruiser's fight is probably of brief duration, and this is clearly the case in which a powerful quick-firing armament must tell greatly.

Esmeralda and Powerful.

To compare fairly the fighting powers of such cruisers as the Powerful and the Esmeralda is not easy. Both vessels depend greatly on their armoured decks. The Powerful has her 6-in. guns in casemates. The Esmeralda has shields to her guns and a water-line belt. Both vessels have armour applied to the protection of ammunition supply and in other ways. The casemate 6-in. shield would defeat the front attack of common shell and the lighter armour-piercing projectiles, and its 2-in. wall inboard would keep out fragments and langridge and in a great measure gas, and it is difficult to see how an entire projectile could strike the inboard wall. The Esmeralda's guns and gun crews, though protected in front, are more open to attack from shells bursting near; on the other hand, her belt affords protection against shells striking near the water-line. Both ships would suffer from their unprotected parts being destroyed by shell fire. The larger ship gains from her actual size and the consequent distribution of assailable and important points, but the Esmeralda has a power of fire enormously greater—that is in proportion to the size of the rectangles shown in the diagram A, and this for half the displacement. The Esmeralda, indeed, would be a terrible antagonist to any ship. Her guns actually perform work capable of lifting the entire ship nearly 66 ft. per minute. It seems probable that ships of this kind will come in for service in a more limited zone than that of our large cruisers.

While, as above remarked, armoured protection is to some extent provided in all cruisers, it may be defective. The Rossia, in spite of her belt, is reported to be an illustration of offensive power developed out of proportion to defence. "Defensive arms retard defeat, offensive arms give victory," says M. Merveillaux du Vignaux; * nevertheless, if the former be neglected, victory may be too much retarded to come at all, or it may be the victory of the dead man who won the field.

We may on the whole conclude that the Powerful and Terrible are equal, if not superior, to any of the cruisers at present building for foreign navies. They combine high speed, fair powers of offence and

* In a paper contributed to the *Revue d'Artillerie.*

defence, and great coal supply. Such a combination of qualities can only be secured on a large displacement. This a critic in the *Yacht* considers to be the first quality for a ship, and he therefore approves the Terrible (which he had just described) as "un fort beau type de corsaire moderne, capable d'arrêter au passage les plus grands paquebots, capable de se débarasser des croiseurs ennemis qui se mettraient en travers de sa route." There are three reasons which make us think that the Powerful type should not be repeated in the British Navy: (1) their enormous dimensions prevent them from using many of the harbours, and what is almost more important many of the docks of the world. (2) They carry a crew of 850 men. (3) The chances of their meeting a Rossia or other antagonist worthy of their steel in a naval war are, to say the least of it, remote, and to employ them for any other service is a considerable waste of power.

The Italian cruiser, Carlo Alberto, with her large area of armoured side, powerful armament, fair speed, and moderate displacement, represents a type which seems to be worthy of imitation in the British Navy.

Second-class cruisers.

The displacement of recent British second-class cruisers approaches 6,000 tons, a size which has hitherto been considered the displacement of a first-class cruiser. The Eclipse class displace 5,600 tons; the Arrogant class, which are of the Eclipse type modified, displace 5,800 tons. The newest French second-class cruisers displace about 4,000 tons. The German cruisers Erzatz Freya, K and L, displace 5,650 tons. The Buenos Aires displaces 4,500 tons.

Armament.

The armament of the British cruisers is hardly as powerful as that of the French ships, and cannot compare with that of the German ships or of the Buenos Aires.

Speed.

The designed speed of the British ships is only 19 knots; that of the German ships is 21 knots; and that of the French ships 20 knots. The Buenos Aires has actually attained a speed on trial of 23 knots.

In sea-keeping qualities our second-class cruisers may possess elements of superiority, but they are certainly the least satisfactory type of vessel which is at present under construction for the British Navy.

C. Orde Browne.
T. A. Brassey.

CHAPTER IX.

The Value of Torpedo Boats in War Time.

The value of torpedo-boats in war time will be felt in two distinct ways—actively and potentially; actively in damage done to men-of-war and merchant vessels, potentially by their reputation and menace governing and checking dispositions and plans, and exercising an unending nightly strain on the officers and men of the opposing fleet. A torpedo-boat may be defined as "a fast small light-draught vessel, whose main armament is a torpedo, and whose function is to attack and destroy larger vessels either in harbour or on the open sea." The main requisite is speed, which is necessary so as to enable them to approach a ship at a rapid rate even when she is running away, to make fast journeys from a base to raiding grounds, or in daytime to flee from, or keep at a desired distance from, a hostile ship. Size is of the next importance. If of exaggerated dimensions they become unhandy, a target for the enemy's larger guns, which ordinarily would not be used against them, and also a target for the torpedoes of hostile boats. If too small they are unequal to the sea-going work required of them. All other considerations are of secondary importance. A modern torpedo-boat is merely a sea-going torpedo-tube of high speed, and as such it should be treated. It will be of advantage, before dealing with the functions of torpedo-boats in war and their capabilities of performing the duties desired of them, to examine the changes which have taken place in the design of boats and the causes which led to such alterations.

The evolution of torpedo-boats is instructive. The original idea comprised two classes of boats. The first class were the smallest boats that could keep the open sea, the second class were the largest boats which a ship could hoist in and carry on board. It is with the former class that I will first deal. In the early days the idea of the main functions of torpedo-boats was to attack ships at anchor in a harbour, consequently small size and good manœuvring powers were considered of great importance, and the size of the boats was reduced to a point which endangered their sea-going qualities. This led to the building of a larger class, the 125 ft. boat, with a sea-going speed of about 17 knots. These boats, first commissioned in 1887, were excellent in their day, and from repeated trials in subsequent manœuvres were found to be of great value both for the attack of ships in harbours and also at sea. But within a very short time two

important changes in war material and defence took place, namely, the speed of ships was increased above that possessed by these boats, and a commencement was made in defending harbours with breakwaters. The former limited their value for attack at sea, the latter for attack in harbour. The breakwater is the only unanswerable argument to a torpedo-boat. Behind it ships are practically secure against boat attack. The only vulnerable point is the entrance or gateway, which is capable of such concentration of defence by gunfire, booms, and boat mines, as to make entrance by unsupported boats practically impossible. Thus these boats have been the cause of enormous outlay in harbour defence, and the threat of their existence compels vessels seeking shelter for coaling or repairs to take refuge in certain definite harbours where they can lie with moderate security.

The falling-off of the speed of these boats by becoming old, and the increase of speed in modern ships, has reduced their efficiency as sea-attacking boats, so that a new class of greater speed and size became a necessity if the boats were to keep their relative value as a weapon for the destruction of ships. But let it be remembered that it is with these boats, with all their disadvantages, that the successes of past yearly naval manœuvres have been gained, and that with great disadvantages against them they have succeeded in harassing and sinking ships of the fleets opposed to them. What must we expect, therefore, if boats are built of treble their efficiency? Such boats we now have. The 125 ft. boat has recently been surpassed by boats of larger build, culminating in the torpedo-boat destroyer, which attains a sea-going speed of 25 knots, has twin screws, and carries the latest improved torpedoes in addition to her guns. The object in view that originally led to the construction of these destroyers was the annihilation of the smaller patterns of torpedo-boats, but it is impossible to doubt that in addition to such work a portion of them must be used as torpedo-boats, and also that when performing their duties as destroyers they will have the opportunity of acting in their torpedo capacity. Briefly, the capabilities of such boats are to keep the sea for a week or less, the exact time being dependent on the speed and nature of the duty undertaken, to command a speed of about 24 or 25 knots, and to carry two torpedoes of great accuracy whose speed is 31 knots, and which have a charge of 150 to 200 lbs. of gun-cotton. Such a torpedo endows them with the power of sinking the largest ship afloat.

There are several general questions which closely affect the value of the torpedo-boat in war time, which it will be well to discuss. The actual chance that a single boat has of torpedoing a single ship must be the main factor in the problem of the value of boats, and it is one which the experience of war alone can solve with absolute

certainty. Boats not only vary in speed, size, and nature of torpedo carried, but also both ship and boat vary in the skilfulness of their officers and men—officers in manœuvring and supervision, men in accuracy of aim and discipline. It is useless to appeal to the results of peace manœuvres to decide this question. Arbitrary time allowances to the boats, or number of aimed rounds from the ship, have to be resorted to. No direct experiments have or can be conveniently carried out to decide this question. The result is that we are absolutely in the dark. Time allowances in manœuvres have two important limits. If over a certain time be allowed, the boat would invariably approach the ship near enough to make certain of hitting her before being put out of action. If less than a certain time be allowed, the boat would always be out of action before having a chance of firing her torpedo. These limitations are quite independent of direct experiment with gun-fire at night, and can only be based on the speed of the approaching boat; this system teaches boats to regard gun-fire at close ranges as equal with that at 1,500 yards. That the system of time allowances is the best that at present is available during large manœuvres is shown by it being adopted in those of late years, but for the purpose of assessing the value of boats versus gun-fire in war, the data of all manœuvres is valueless. War will admit of no hypothesis, or compromise with convenience—facts will then be facts. Suddenness of attack, invisibility, rapidity of movement, as well as the large size of target that the ship presents, are points in favour of the boat; whereas detection at a distance, errors in adjustment of torpedoes and director would help the ship. But above everything let us beware of giving too false a feeling of security to the ship by assessing necessarily hurried and excited gun-firing too highly.

For the sake of argument we will assume while considering this question that over a large number of cases the chances of success would be equal, and that speaking generally a torpedo boat will, in half the cases of attack, disable an ironclad, and that conversely in half the number of cases the boat will be destroyed. With more than one boat against a single ship the chances will therefore lie with the boats. Nor will these chances be practically altered if more than one ship is in company, since all the boats will concentrate their attack on one or more ships which cannot receive much support from the gun-fire of the others. Again, the larger the number of ships the greater the chances of choice of an advantageous ship to attack. Ships must always be ignorant of the plan and direction of attack as well as of the number of boats attacking. It is hardly conceivable that with even only three boats, they would ever be detected, separately fired at,

and disabled by the gun-fire of a ship within the two or three moments available before the torpedoes were fired. If once a boat has got to close quarters at night it is an unpalatable though potent fact that owing to size of target the chances of success lie largely with the boat.

The inherent feature of torpedo-boats which governs their use in war time is that the boats are of small value compared with a battleship or cruiser. By value is meant small cost, that they can be rapidly replaced, and that the number of men they carry is small, So that for this reason they can be used, risked, and if necessary lost. to obtain ends which may be of great moment without more than small relative loss to their own side. This is no age for squeamishness in using the weapons a country supplies. The tools we handle now are far keener than any hitherto employed, the ends to be obtained are of vital worth, and I venture to predict that the successful side will be that on which the admirals and captains do not hesitate to employ the ships and boats in the way that leads most surely to the disablement of their opponents without being unduly deterred by sentiment, or by risks which may be legitimately incurred. In history we have on record many cases when to obtain strategical advantages inferior squadrons did, or should have engaged superior ones to reduce their numbers, although themselves courting annihilation. How much the more may not such a necessity arise in the future, since with modern weapons a single ship may, if well handled, inflict much and lasting damage on two or more. How much more vulnerable have not our ships become at close quarters to the powerful weapons now in use than ever was the case in the early part of the century, when a possibility of a single shot totally disabling a ship, or of the smallest craft floating having the power of destroying a battleship, were factors absolutely unknown in warfare. Those vessels which can be best risked are those of least worth, and which can be most easily replaced; so that putting sentiment on one side, the *raison d'être* of the power of a torpedo-boat lies in the fact that it can be used and risked without its loss being of great moment to the fleet.

One of the great considerations which has hitherto always hampered the employment of torpedo-boats in manœuvres, for any attacks except those from a base, has been the necessity for not risking the boats. In peace time there would be more fuss over the loss of a torpedo-boat than there would be in war time over the loss of a battleship. The result has been that most properly no admiral or captain has employed boats on service where the existence of one or more was seriously risked, although the boats might have been invaluable to his plans. In peace manœuvres if a boat accompanies a fleet on the open sea it may develop into an unmitigated nuisance to that fleet.

It can only accompany the fleet for half its coal capacity distance, any breakdown to machinery necessitates one ship at least stopping to look after the boat. In bad weather with a heavy sea the speed of the boat falls off more rapidly than that of the fleet, until the whole squadron, or at least a ship or two are delayed to look after the boats, which means increase of worry to the admiral and hampering the fleet. In war time all this would be changed. An admiral who leaves a base in command of a fleet with the practical certainty of an engagement and knowing that probably he will have, more or less, every ship disabled and some sunk, will not weigh so nicely the chances of whether a boat or two are left behind or lost on the road. If he considers that boats will be of use at the time of meeting the enemy, or during an engagement, surely, if he has boats at his disposal not required for equally important work, he will take them, but with the understanding that they keep with the fleet as long as they can, but in every way of help are to be independent of it, that they are to assist him, not he them. Looking upon the use of boats in this light, they may in the future be of incalculable value to an admiral who may sail from his port to attack an equal or superior fleet, and even save him some ships when meeting an inferior number.

Boats in these days are quite capable of riding out almost any class of weather, although they have to lie to perhaps with a sea anchor if the weather be very bad. Because they are left behind they are not necessarily lost. Again, if strained to the limit of their coal endurance they do not sink, and the chances would almost be in their favour if left behind, of the crews, if not the boats, being subsequently relieved when opportunity occurs. At all events if the game is worth undertaking the attendant risks should be run.

One more general question remains, namely, the danger that exists of boats attacking and destroying friendly ships. No consideration affects fundamentally the value of torpedo-boats more than this, for if such a danger practically exists, then the work of boats would have to be largely curtailed. No such danger really exists if the duties of the officers commanding the boats are clearly defined, and if they have an intelligent knowledge of the work they are called on to perform. But the danger to the country is so great if boats are allowed to rove about without definite orders, that too much stress cannot be laid on the following points. The boat, as previously laid down, is of no value compared with the ship, and therefore the onus of sinking a friendly ship, should lie entirely on the boat. A boat at night is a pariah to every ship afloat. She should approach no friendly ship intentionally, and should attack no ship without direct evidence that she is an enemy. A ship should always fire on any boat—

whether suspected of being a friend or an enemy—that approaches her at night, since it is far better to sink a friendly boat than risk losing a ship by mistaking the identity of an enemy's boat. Since therefore every ship should fire on every approaching boat, no boat should take the fact of a ship firing on her as evidence that she is an enemy. The only safe way yet known of conducting an attack on a doubtful ship, is for the boat to challenge the ship by a signalling method, and to allow a reasonably sufficient time for reply. The time occupied in approaching will ordinarily be sufficient, so that no real delay is caused to the boat. In such a case the boat has the *primâ facie* evidence that the ship is an enemy by appearance, and perhaps position and course, which is strengthened to a certainty by the wrong answering, or non answering of her special challenge. A procedure such as the above, cannot be too strongly insisted on if boats are to be used with safety in waters where both enemy's and friendly ships may be met with. Moreover a torpedo-boat attack should be a deliberate attack, much of the hurry and mistake which occur in manœuvres is due to the necessity of having hard and fast rules and time allowances. The real chances of war cannot be imitated, and too great a fixity of the rules are apt to hurry boats, and lead them into false tactics.

Passing to the consideration of the various ways in which boats can be used in war time, the ones I will select to deal with are:—

Attack on a harbour or fleet in a known locality.
Blockading.
Keeping blockaded ports open.
Protection of narrow waters.
Accompanying and acting with a fleet.

The effective distance that a boat can be employed from a base depends whether the service on which it is employed is ordinary or extraordinary, that is whether the duties consist merely of patrols continuing night after night in waters where hostile vessels may be met; or whether the work undertaken is of vital importance where a definite duty has to be done by the boats at any hazard to themselves. The ordinary range of boat work is limited by the distance that can be steamed during the hours of darkness to and from protected limits from the shore. If patrolling, it should be remembered that for reasons of lookout in moderately bad weather, and also to prevent flaming at the funnels and consequent premature detection, it is not advisable generally to cruise in the patrol area at more than three-quarter speed. The effective distance for extraordinary work depends on the nature of the base. From a shore base for an attack on a harbour, the distance is the full speed of the boat during the hours of

darkness to the harbour. With a protecting cruiser as escort, the distance is the coal endurance at the desired speed. With a fleet the maximum distance is the coal endurance of the boats for the speed of the fleet. And lastly for a blockade, the time of blockade is the coal capacity at economical speed less twice the coal consumption to and from the base, less an allowance for contingencies according to the place and likely weather for the time of the year.

It is safe to assume that in the future attacks on harbours will only be undertaken by boats accompanied by a larger vessel, for either of two reasons. If the harbour is within the easy reach of a torpedo-boat station, it is only reasonable to assume that in these days it will be defended by breakwaters, whose gap would be closed by a gate boom. A heavy vessel would therefore be required to break away the boom. If, on the other hand, the port is undefended, ships will not use it unless out of range of ordinary torpedo-boat night attack, in which case a protecting vessel will be of advantage to the boat during the hours of daylight of the cruise. It may well be worth the loan of such a vessel, on occasions to attack a fleet sheltering in a harbour, protected by mines and batteries from a hostile fleet, yet open to torpedo-boat attack; attacks of this nature will be all the more deadly from being unexpected, so that the further the distance of a raid, the more likely is the enemy to be unprepared. Again, occasion might arise when it would be well worth the risk to an old vessel of clearing away a boom, to open a fleet to the flood of a torpedo-boat attack. Such a ship would clear away boat mines, and any other obstructions, with but little inconvenience to herself, but in turn would have navigation difficulties, torpedo-boats, batteries and mines to contend with. Whether such an attempt would be made in war time would simply depend on whether the material was available when the opportunity occurred, and if the chances of success of the particular enterprise were such as to warrant the undertaking. Blockading may be even more a case of necessity in future wars than in those of days gone by, since ships will be forced into harbours more frequently from want of coal, than ever they were from scarcity of provisions and stores in the olden time, also it will probably be the duty of a fleet to close the most important of the enemies' harbours to the entry and egress of fleets, cruisers, or merchant vessels. For this work at night-time ships are eminently unsuited. A harbour used as a coaling base, or a secure refuge for ships, would undoubtedly be infested by torpedo-boats, and any ship approaching within a moderate distance from the shore, would certainly be attacked and probably sunk. Any ship attempting to escape by breaking the blockade would be escorted by a crowd of such boats, which would

boom off any cruisers and give her a good start on her errand. In daytime, of course the boats would be more or less useless; but with a fleet in the neighbourhood, ships attempting to escape would do so at night-time not in daylight. By having waters neighbouring a port infested at night-time with boats friendly to that port, those waters would be, to a great extent, kept open to ships seeking refuge or coal; and, by forcing blockading ships to keep well in the offing, they are compelled to extend and therefore weaken the line of blockade. Slow boats should be able to keep ships at least at a radius of 50 miles from the port, and fast ones would increase this distance to nearly 100 miles in moderate weather.

In the use of boats for blockading purposes difficulties of a serious nature arise, but apart from these with which I will deal shortly, boats are undoubtedly the most efficient blockading squadron at night. Capable of keeping close in shore they have only boats to fear, and these they can meet on equal terms. Undoubtedly near a harbour full of resources they would be harassed by means devised for the purpose, and perhaps vessels of special construction not yet built; but so long as they exist before the harbour at night they are a potent threat to any escaping vessel. In spite of these advantages the practical difficulty of using boats for this purpose is very great. Boats are capable of keeping the sea in really bad weather, and their crews will undoubtedly strain every nerve and perform wonders in the way of devotion and exertion, but the strain upon them will be enormous, and energy is bound to lag when abnormal duty is carried on for weeks and months. Novelty and excitement then degenerate into dull routine. If the port was a considerable distance from a friendly torpedo harbour, a very large number of boats would be required; so that any port more than about one day's steaming at economical speed from a friendly base would practically be out of the limits of a lengthy blockade. Coal and small repairs, change of crews, and perhaps fresh water, would necessitate communication with a base at least once a week. Such a base could for a short time be one of the ships of the blockading squadron, for if necessary, in moderate weather, coal, water, men and supplies could be received from her. This any one knowing the resources and energy of the officers and men of a fleet would agree to, but for such work to continue for a long time is impossible; in time the boats would be forced to return to a harbour. This practically means that about one-third of the boats only could remain at their station in the blockade for four days at a time. Losses and accidents would probably soon reduce the effective number, and unless there were others ready to supply their place the blockade by boats would gradually fail. It

is obviously absurd to state a time that such a blockade could be maintained; time of the year, distance from a base, number of boats, and locality being ever-varying but most important factors. The admiral only could decide on the practicability of such a blockade of a given port. If he considered it of use it could be done, subject to the practical limits before referred to.

Analogous to the use of boats for the blockade of a harbour is their use in the patrol of narrow waters. The object of such a patrol depends on the locality. The home boats of a port may be used to keep that port free of blockade at night, or in certain places they can be used to control the passage of fleets or of hostile cruisers, and even perhaps merchant vessels. The limiting factors of these cases are apparent, and have been previously discussed. They depend chiefly on the distance of the patrol area from the base.

Boats may be of immense value operating with a fleet at sea against another fleet. Broadly speaking, the principle of boats accompanying a fleet while cruising has been condemned, but chiefly on peace manœuvre data. Indiscriminate use of boats with a fleet will undoubtedly worry and harass the boats, and in peace time, as already pointed out, the boats are apt to become an incubus to the fleet. But we must not blindly neglect the many occasions when boats present with a fleet may be of incalculable worth. If a general action is expected with an enemy's fleet at sea, boats find an important place in the fleet, and undoubtedly should accompany it if possible, of course under the understanding previously laid down that they are absolutely self-supporting. Their duties would be to do as much damage as possible to the enemy before the fleets met, and also during and after an action. If the cruisers get touch of the enemy in the afternoon or evening, an opportunity would occur for a torpedo-boat attack during the night, which might be the means of severely punishing and reducing the number of the fleet before the morning, and make a considerable difference to the action on the following day. Again, during the action opportunities might occur for an attack by the boat when the action was at its hottest and the attention of ships chiefly directed to each other. This, of course would be greatly accentuated if the weather were thick, or if opportunities arose from rain squalls, or fog banks. But of all times the close of an action will be the time when the greatest opportunities will occur for the boat to act. Ships will then be probably very severely handled, especially in their secondary and quick-firing armaments, and therefore more or less defenceless against boats. Their larger and better protected guns would effectually prevent the near approach of even a third-class cruiser, while a boat being so

small a target would have a much better chance of being missed. Then the action of boats should be sharp and decisive, and many a ship which would otherwise have survived could be pursued, even if night had to be waited for, and sunk by the boats. The position and tactics of boats in an action is out of the scope of this chapter, but much might be said on the subject. Good, cool, hard-headed men in 25-knot boats are factors never yet tried in fleet actions, but are ones which would go far towards affecting their issue.

Towards the close of a war would probably be a time when torpedo craft would be largely used. However quickly we may destroy ships and boats, the quickest built vessels will soon reappear, either in the form we now know them, or embodying the experience of the previous war time. These will find ample employment in harrying our ships of war and our commerce, and supposing ourselves victorious on the sea, but with a reduced and comparatively feeble fleet, we may expect a continued guerilla warfare carried on against us by vessels whose arm is the torpedo, and whose security is speed.

Passing to the value of the smaller boats carried by ships, two important considerations at once arise which largely limit their use. One is, that after a ship has been under gun-fire, for a very short time even, her boats will in all probability be destroyed. The other is the great difficulty of hoisting them out in a seaway. In cases where these two factors do not enter, such boats can be used in several ways. If a ship chases another into a harbour where the attacking ship cannot enter, the ship outside might send her boats to attack her at night. The ship chased might hoist them out and attack the ship outside at night assisted by her boats. Again, if the weather is exceedingly fine, the boats of a fleet might be hoisted out before a general action and used during that action. Another use that might be resorted to is, if a pursued ship at night has a breakdown, or any other cause should make it advisable to do so she can hoist out a boat and leave it in her wake to attack the following ships. Generally the uses of boats carried by ships are identical with sea-keeping ones, except their base must always be the ship, which base they are often unable to leave, and their use is only possible in fairly fine weather.

The contention that boats are the arm of the weaker sea power has been generally upheld by writers on the subject of naval warfare, and there is much to say for it provided that boats are slow and their uses restricted. But if the use of boats in war time proves more extended than up to the present has been the practice in peace manœuvres, many cases will arise when boats will be of equal importance to the side possessing the larger or smaller number of ships. With increased speed and sea-going capacity, the functions

of boats are largely augmented and expand year by year. By neglecting the consideration of every possible use of boats, and in not calculating on their use in every phase of naval warfare, we run the risk of finding ourselves confronted in war time with unforeseen dangers, and perhaps may often experience times when a battleship and boat are of equal worth, and a superiority of ships is reduced and annulled by an inferiority in number of small craft. Though fully alive to the many important lessons that the study of past warfare affords us, we must still admit that no craft in the past was analogous to the torpedo-boat. The vessels that in olden time some writers have held to resemble them are "fireships, flotillas and praams." The latter two were unable to destroy battleships, the former were chiefly dependent on a fair wind and tide. The comparison totally neglects the two essential features of the boat. We cannot therefore rely on the value of small craft in the old wars to teach the true value of the torpedo-boat in the future—we must be alive to the fact that we have ourselves, and have opposed to us vessels whose real value we cannot assess in peace time, but which possess possibilities of action unknown in times past, and which in the hands of skilful and resolute men will leave a broad and deep scar on future naval wars. By a short and absolutely arbitrary time allowance in attack, by too great an estimate of the accuracy of night gun-fire, and by a general limitation of the functions of boats due to the requirements of annual manœuvres, we are gradually lowering the estimate of the danger to be expected from boats in war time, weapons which the majority of authorities agree will be most largely used against us. This is to us a very serious danger.

The yearly manœuvres are of the greatest value to all who take part in them, and serve to show to a large extent the value of our modern weapons, but let us be very careful how we are influenced by decisions which are mainly the outcome of arbitrary rules and which cannot be regulated by direct experiment. How many of the greatest achievements of our officers, men, and ships in the old wars, would have placed them out of action if they had occurred in manœuvres? How many cutting-out expeditions would have succeeded if time allowance, instead of hurried and difficult night shooting, had been the criterion of success? In these respects history is certain to repeat itself. Science has placed weapons of unknown possibilities in the hands of men, we hope of capabilities and morale equal to that of their forefathers, and when the crash of war comes, and possibilities are changed into realities, we may expect to find torpedo-boats a far more important factor than they are apt to be considered in peace time.

R. H. BACON.

CHAPTER X.

Our Ordnance Factories.

Articles have recently appeared in the *Times, Engineer, Broad Arrow*, and *St. James's Gazette* on the Ordnance Factories, sharply criticising the organization and system of appointing superintendents and other officials. The *Times* and *Broad Arrow* specially attacked the appointment of the present Director-General of Ordnance Factories. The former dwelt on the difficulties which arise when the position is occupied by a civilian Director-General coming straight from a manufacturing firm which habitually tenders for contracts and executes Government work. The *Engineer* and *St. James's Gazette* took the opposite line, the former insisting on the evil of "suddenly" appointing officers to take charge of factories who have no technical training and know nothing of workmen. These sentences crudely express the main objections made to the appointments of civilians and officers respectively to our manufacturing departments, and it may be desirable to begin with this element of the question before noticing others. It is an important matter and one which calls for calm impartiality if any good is to be done in discussing it.

In the appointment of an eminent civilian manufacturer, the object sought is well-established ability and experience, especially, so it is said, in the working of factories with commercial success; and naturally the experience most desired is that relating to the plant and manufacturing operations most nearly resembling those of our ordnance factories. The very shaping of these requirements describes a man at the head of an establishment undertaking Government contract work. The objections urged against Dr. Anderson equally apply to Lord Armstrong, the only other civilian who has superintended a manufacturing department in the Royal Arsenal. Further, it may be urged against other eminent individuals, who went direct from Elswick to the Admiralty; and would probably apply to almost any civilian who possessed the desired qualifications.

It would be unfair then to urge this objection as having any

special application to our present Director of Ordnance Factories. On the other hand, the assumption that officers can have "no technical training" must be made in ignorance of the fact that the country is constantly spending large sums of money in training officers for manufacturing appointments in what is termed the advanced or senior class. Such officers are selected by an examination in mathematics and in certain branches of science.

After passing this examination successfully, officers devote two years to studying manufacturing operations and continue to work at mathematics and different branches of science. One who qualifies at the end of the two years has in no single instance been "suddenly" placed at the head of an establishment, but in a subordinate position, in which he acquires an intimate knowledge of the very establishment for the superintendence of which he presumably may be considered an eligible candidate, though probably by no means the only one.* This species of training, it may however be urged, is not equal to that of a mechanical engineer who has served his time in the various workshops, and who thus has the power of a man who could call on any workman to stand aside while he takes his place at the lathe or vice, and an experienced eye which enables him to judge of the work performed by any tool, and, what is also important, of reports made by those under him as to the working of machinery. It would be wrong to make little of this practical knowledge, but it may be questioned if it can be often found in company with high mathematics and science training. Where it is thus found, there still remain to balance each other, on the side of the mechanical engineer, the special practical knowledge acquired by the handling of tools, and on the side of the officer, the special practical knowledge of the use of the article to be manufactured, be it gun, carriage, shell, or fuze. The *Engineer* writer observes that no question has been raised as to the competency of private manufacturers to turn out guns, carriages, ammunition, and other war stores, yet, he says, with one notable exception, these firms are not under military direction. For the application of this test, it may be urged that such firms will generally insist on what actually pays and works best, and it thus deserves examination in detail.

The chief firm that has made war *matériel* in England is Elswick, which is perhaps the only establishment in the world that will turn out a first-class man-of-war, complete with all her armament,

* This course is the regular one for artillery officers seeking manufacturing appointments. Officers of the Navy and Royal Engineers have not hitherto been through it, and in exceptional cases artillery officers have had appointments without passing through it.

the armour and engines only being made outside Elswick itself. Probably all the war stores above enumerated made in all other private establishments in England if put together would be a small quantity compared with those made in Elswick. This is doubtless the so-called "notable exception," seeing that its Managing Director for a great many years past has been Sir Andrew Noble, who left the Royal Artillery at the request of Lord Armstrong about 1858, when the manufacture of war *matériel* was first commenced at Elswick. Whitworth's naturally comes next to mind, and Sir Joseph Whitworth, like Lord Armstrong, at an early date secured an artillery officer in the person of Colonel Dyer, R.A. This officer subsequently left him to join Elswick, where he took charge of the steel works, a specially successful department in that establishment. Some years since, it was proposed to manufacture war *matériel* other than ships at Palmer's, and, as in the case of Elswick's and Whitworth's, the services of an officer were secured in the person of Colonel English, R.E., who afterwards became the Managing Director of the entire shipbuilding establishment, and was so at the time that the *Engineer* article appeared. As to armour makers, Messrs. Brown applied to the War Office and secured Captain Tresidder, R.E., the inventor of the process that bears his name, which at one time carried Brown's plates to the very front of progress. Messrs Vickers have recently engaged Lieut. Dawson, R.N., on their staff. Nordenfelt's have an admiral as Director, and have employed both naval and artillery officers. It appears, then, that while officers generally know nothing of manufacturing work, striking exceptions often occur. It would, in fact, be tedious to go through the other kinds of manufacturing establishments where officers are taking leading parts. It may suffice to name Bolchow Vaughan's works, where 13,000 men are now employed under Colonel Jasper Davis, late R.E., as Managing Director.* Certainly the private firms manufacturing war *matériel* who have not employed officers in leading and important positions constitute the exception and not the rule. It may be noticed also that the above is simply a record of facts, and not a statement of opinion. The bearing of this on the question will be noticed presently.

To pass on to the system on which our departments are worked. This will be best understood by taking a very brief review of the changes during the last forty years. At the period of the Crimean War, and for some time subsequently, the manufacturing

* With regard to commercial success, it is curious that at the present time, when little has been made generally in business, some of the most remarkable commercial successes have been achieved by officers. Beside the case of Elswick, may be quoted the Army and Navy Stores, the Aerated Bread Company, and the Incandescent Light Company.

departments were under a head whose title may have been changed more than once, but who eventually became the "Director of Artillery." The superintendents were responsible to him and to the military side of the War Office for their entire departments. All accounts were naturally referred for examination to the civil side of the War Office, but all orders were given and manufacturing arrangements were made by the Secretary of State for War through his military advisers. The superintendent of the Gun Factories, Carriage Department, Laboratory, Enfield or Waltham Abbey had under him all branches of his department. He gave the orders; his manager and men made the stores; his gaugers and examiners checked the manufacture; his clerks paid the men. He was a great power, and required corresponding ability and experience. He remained in his position for an indefinite time, and his department bore the stamp of his individuality. Such a superintendent was General Boxer or Colonel Clerk.

The objections made to this system at the time were chiefly based on the ground of stagnation. It was difficult to criticise or effectually check a superintendent of those days, who, it must be remembered, was a monopolist, for private competition then hardly existed. He had neither the salary of the director of a private firm nor the pecuniary interest in the commercial success of his work. It was only an exceptional man, like those whose names we have mentioned, who would not be tempted to take matters more easily than might be wished.

Next came in the remedies of special training and the five years' system. The former has been spoken of, the latter was probably designed for a better use than was made of it. An officer was to be appointed for five years, but it was probably intended that one who had been particularly successful might, when it was clearly for the public good, be reappointed; thus, while ordinary officers, without any slur on them, would return to regimental work, exceptionally good ones would be retained. Instead of this, however, when the system was actually put into practice, it was insisted that every officer must return to the ranks at the end of five years. His place was then filled up by a successor, and if he obtained another manufacturing appointment—which was only possible after two years—it was probably in a new department, and over managers, men, and work all strange to him. To trace out the evil effects of this system would be a long task. Disappointment and disgust were the inevitable results, and these would naturally be most severely felt by the officers who most thoroughly grappled with their work. Evils of another kind followed. Clearly the continuity and character of a department now greatly

depended on the permanent manager—in nearly every case a Woolwich mechanic who had risen from the bench. His pay was perhaps £450 a year. The temptations to which he was exposed were enormous. £30,000 worth of machinery might be delivered to his department in a comparatively short space of time by a single firm. Whether such machinery worked well or not lay largely with him and his men, and the interests of the workmen under him clearly depended on him much more than on the temporary Superintendent over him. Those who know anything of manufacture will be aware that £450 a year for a Manager over a department turning out perhaps £500,000 worth of work in the year was miserably insufficient. Capital managers existed, but, as was pointed out before the event, sooner or later corruption must come in. The story of the unjust steward was eventually so far enacted, that the War Office actually made it a condition that no orders should be given to a manufacturing firm who received the discharged delinquent "into their houses." Imagination may be left to supply the details that could be given if desired, and it may be well to pass at once to the present system, which came in in 1887, being based on the recommendations of Lord Morley's committee. It was, in fact, mainly the embodiment of the suggestions of one witness possessed of clear views and a masterful mind. This was General Maitland. Like other able men, he grasped at power, and may probably have felt that he could produce great results if all the departments were placed under him in new and more dependent relations. Carrying all before him, he was appointed the first Director of Ordnance Factories, including those at the Arsenal, Waltham Abbey, and Enfield, and he was succeeded by Doctor Anderson, the present Director. The present system, however, differs in many respects from what was recommended, and is said not to be the better for the differences.

At present the Manufacturing Departments are transferred to the civil side of the War Office, and placed under the Director of Ordnance Factories, and directly under him, and independent of the Superintendents, is a department of "work-takers," who move about in the departments and make up the pay-sheets.

Besides this, there is an Inspection Branch, under the military side of the War Office, worked by officers who are, as they ought to be, quite independent of the Manufacturing Departments whose work passes through their hands. In addition to the duties of inspection, the drawing-up of handbooks and tables is undertaken by them. In fact, they act for the Inspector-General of Ordnance, or, as he was called till lately, the Director of Artillery. They receive every store and pass it into the service whether made by Government factories or

by contract. This establishment is almost a necessity, now that much work is done by contract, for contractors not unnaturally complained in former times, when their work was submitted to the Examiners of a Government factory, that they were, in a sense, being judged by their rivals. It is now complained, however, that much unnecessary work is done, and much work is done twice over, so that expense is incurred uselessly. With regard to the other features in the present system also, the machine works cumbrously, and it is said to be very costly.

Further, the Superintendents of Departments are not in a satisfactory position. The five years' system has happily been done away with, but a man at the head of so large an establishment as one turning out, perhaps, in the year material costing a million pounds, generally works best when he is entrusted with more responsibility and has more opportunity of distinction than is afforded on the present system. A Superintendent at the present time is but the shadow of his predecessors in these respects, while performing probably more work. Some improvement is felt to be needed, and the remedy is sought in two alternative schemes which, to avoid personalities, may be termed the civil and military remedies.

The former aims at replacing the officers at the head of the manufacturing departments by civilians. Officers, it is admitted, have a practical knowledge of what is needed for the service. "Use their powers then," it is said, "in checking the designs brought forward, as is now done by the Ordnance Committee, in passing actual stores into the service, as is now done by the Inspection Branch, and further let us organize a department where officers who are gifted for the work may draw up their designs. Let the factories simply manufacture whatever is decided to be made, and let these be under mechanical engineers whose trade is to perform such work."

The military remedy is the opposite. Admitting the technical knowledge of tools and machines possessed by the mechanical engineer, it is argued that this is the qualification of a Manager rather than a Superintendent, and that an establishment turning out work representing a million a year calls for other and higher qualities; that, in fact, the shape into which General Maitland's scheme is now sought to be pushed is to substitute one civil superintendent for five military ones, and to work the five departments by five managers; that the work of one of these is so wholly distinct from that of another as to call for a special man possessing high scientific ability rather than a knowledge of tools and machinery, for every departmental attempt at manufacture of a new store must be accompanied by departmental investigation and experiment; and that

this should be directed by a man who is master of the requirements and performance demanded, whether of gun, fuze, or carriage, and for this an officer only has the training; moreover, that a very essential qualification is the character for integrity and honesty, and that, without questioning that this could be found in members from any class of Englishmen, it has been notoriously maintained by officers in Government Departments. General Blumenthal was once consulted on this question, and bluntly recommended that England should stick to a system which had, as its characteristic, that perfect honesty which he complained was generally wanting abroad. Five gigantic departments, it is urged, varying in their character and work, of which three only are in the same locality, can only be worked well by Superintendents acting with reasonable freedom and responsibility. No man can be at the same time the best authority on powder, on hydraulic machinery, on small arms and swords, on heavy guns and on fuzes. The superintendent of each department must surely give the best opinion on his special branch of work. That opinion should come in his name, carrying the credit or blame following it. The opportunity of achieving reputation is a powerful incentive, and one that costs the country nothing. So far as any system prevents it, so far it defrauds both the country and the individual. General Maitland must have seen the evil of a regiment worked by a colonel through his adjutant and sergeant-majors, rather than through the company officers, and he should have avoided any approach to a similar system.

"Sweep away the office of Director of Ordnance Factories and all the costly machinery which owes its origin to the ambition of one man to absorb everything into himself," it is said. The Director of Ordnance Factories however, if needed, performs the highest functions if he works entirely through the Superintendents, who are his natural assistants. He is the only man necessarily qualified to appreciate and direct their work, and he ought to have corresponding powers. The interests involved are enormous. No Superintendent should be appointed, by any possibility, of whose powers the Director is not satisfied. Let the Superintendent be responsible to the Director for everything done in his department, and let their united work be thoroughly checked by the Inspection Branch acting for the combatant interests. This it is urged would effect great saving of money, and great increase in efficiency.

Valuable lessons are often to be learned from the United States. Before beginning to manufacture war *matériel* up to modern requirements, a Commission was sent to examine the system of the leading European Powers, and the subsequent success of the United States

manufacturing establishments has been extraordinary. Estimates of powers of guns published in advance have been completely realized when the guns were eventually made. Not only has success been remarkably rapid, it has been equally remarkable in being unattended by failure. This success has been achieved from beginning to end under the direction of officers. The advocates of the military and civil view alike court investigation, which, considering the issues at stake, appears very desirable.

C. ORDE BROWNE.

CHAPTER XI.

British Naval Manœuvres.

The Naval Manœuvres of 1891, it will be remembered, were mainly of a tactical character. Since that year several strategical problems have been investigated in which the public were able to take some interest, but in 1895 the Admiralty again decided to confine the naval operations to tactical exercises. It would be a grave mistake to assume that these operations were valueless merely because they failed to attract the fickle interest of "the man in the street." The tactical exercises of 1895 undoubtedly afforded valuable experience to many thousands of officers and men, and this result in itself would have amply justified the expenditure attendant upon a partial mobilisation of the Fleet. The operations of mimic warfare are valuable in their way, but can scarcely be said to have definitely solved any complicated strategic problem. Past encounters between Red and Blue Fleets have not invariably thrown much new light upon naval problems, and through one cause or another the plans of operations have more than once been subjected to severe criticism in the Press. The only experiment in which the mobilised squadrons took part last summer was again somewhat too simple and obvious to satisfy the critics, and this tendency on the part of the Admiralty to investigate the obvious is certainly a fair subject for adverse criticism. Still the experiment was not wholly devoid of interest, and the exceedingly prompt solution of a comparatively simple problem in scouting was at least partly due to the intelligence of the admirals in command. We shall show, however, that the experiment might have been of greater value if the Admiralty had made higher demands upon the ingenuity of the admirals and captains.

Tactical exercises.

Apart from this the tactical exercises were instructive as ever, and the operations of the Torpedo Squadron should tend to determine the value of the new torpedo-boat destroyers. For reasons of their own the Admiralty declined to permit newspaper correspondents to witness the manœuvres of the Torpedo Squadron, and as no official report of any kind has been issued we cannot attempt to draw very definite or valuable conclusions from the reports of the unauthorised correspondents. Mr. W. H. Smith once observed that foreign nations

sooner or later found out all they wanted to know concerning our public Services, and there was doubtless much truth in the statement. In some respects it is poor policy to keep the British taxpayer in the dark by conducting naval manœuvres in a "confidential" atmosphere, and last summer especially the public would have welcomed a satisfactory report upon an untried weapon of naval warfare. So far as our information goes, however, it is satisfactory to find that the new destroyers appear to have justified the anticipations of the Admiralty.

Admiralty orders.

The partial mobilisation of the Fleet was postponed from the 17th to the 24th July, in order to give naval voters opportunities of exercising the franchise. This decision caused satisfaction throughout the Navy, although it may not have greatly influenced the General Election. The following orders, issued by the Admiralty, will help to explain the scheme of operations :—

TACTICAL EXERCISES, 1895.

General Orders and Instructions.

"The Lords Commissioners of the Admiralty have decided to take advantage of the partial mobilisation of the Fleet to carry out this year exercises of a tactical character. These will consist of a series of exercises to be performed by two independent fleets, and of certain exercises and manœuvres to be undertaken by a torpedo squadron in the St. George's Channel.

"The ships and vessels assigned to the Channel Fleet will assemble at Portland. Those assigned to the Reserve Fleet will assemble at Tor Bay. The torpedo squadron will first assemble at Plymouth.

"When in all respects ready the Channel and Reserve Fleets will proceed to sea for a period of exercise which may be extended to the evening of the 3rd August. The exercises during the cruise should include :—

1. Fleet evolutions.
2. Exercises in cruising formations at night.
3. Exercises in battle formations during the day.
4. Anchoring and weighing the fleet.
5. Scouting and distant signalling.

"At the expiration of the first cruise the Channel Fleet will proceed to Berehaven and the Reserve Fleet to Lough Swilly, to complete with coal and prepare for the second cruise.

"Both fleets are to leave their respective ports on the 8th August,

weather permitting, and each will proceed to a rendezvous to be hereafter communicated to the admirals in command, from which positions they will take the necessary measures by means of their scouts and cruisers for finding each other and effecting a junction.

"The two fleets will then be organised as one, and under the command of the Vice-Admiral will continue the evolutionary cruise until the 14th August, when the fleets will separate, and proceed to carry out target practice, returning to their ports as may be arranged by the admirals commanding.

"On return to their ports of assembly all mobilised ships are to be inspected, and are to be back at their ports of commissioning by the 20th August.—Admiralty, July 1895."

The composition of the squadrons was as follows :—

Channel Fleet.	Reserve Fleet.	Torpedo Squadron.
Battleships—	*Battleships*—	*Cruisers*—
Royal Sovereign (Flag)	Alexandra (Flag)	*Hermione (Flag)
Empress of India (Flag)	Benbow	*Fox
Resolution	Dreadnought	
Repulse	Edinburgh	*For Auxiliary Duties*—
	Colossus	Magnet
Cruisers—		Curlew
Blenheim	*Cruisers*—	Seahorse
Endymion	Warspite (Flag)	Traveller
*Grafton	Galatea	Landrail
*Theseus	*Flora	
*Charybdis	*Astræa	*Torpedo-boat Destroyers*—
*Forte	*Thames	Daring
*Latona	Mersey	*Havock
*Indefatigable	Melampus	*Decoy
*Iphigenia	*Naiad	*Boxer
*Andromache	*Tribune	*Bruiser
*Apollo	*Thetis	*Dasher †
*Pearl	*Iris	Ferret
Bellona		*Dragon
	Torpedo-gunboats—	*Rocket
Torpedo-gunboats—	Leda	*Shark
Speedy	Onyx	*Surly
Halcyon	Renard	*Banshee
Jason	Salamander	
Niger	*Hazard	*Torpedo-boats*—
Sheldrake	*Antelope	79*
*Alarm		83*D
		84*
		94*D
		95*D
		80*
		85*
		86*
		87*
		72*
		73*
		74*

* Ships specially commissioned. † Replaced by Contest.

Of the sixty-three ships brought together for the manœuvres, it will

be seen that thirty-one were specially commissioned, besides twelve torpedo-boats. The reserve ships were, as usual, partially manned by coast-guardsmen and a sprinkling of reserve men. At the naval ports the following vessels were mobilised:—

Portsmouth: Second-class cruisers Fox, Latona, Indefatigable, Iphigenia, Naiad, Iris; destroyers: Havock, Decoy, Boxer, Bruiser, and Dasher; torpedo-boats: Five. The crews of the Leda, Niger, and Salamander were also increased to the complement.

Chatham (*Medway Reserve*):—Grafton and Theseus, first-class cruisers; Charybdis, Forte, Tribune, Thetis, Andromache, and Apollo, second-class cruisers; and three torpedo-boats.

Devonport:—Flora, Hermione, Astræa, and Thames, second-class cruisers; Pearl, third-class cruiser; Hazard and Antelope, torpedo gunboats; Rocket, Shark, Surly, and Banshee, destroyers; and four torpedo-boats.

The mobilisation.

The mobilisation of these thirty-one vessels and twelve torpedo-boats, and the completion of the Reserve ships' complements was effected without the slightest difficulty. The number of men at the depôts was amply sufficient. The Medway reserve, which a few weeks earlier had supplied crews for the first-class cruisers Grafton and Theseus, was not quite equal to the further demand for 2000 men; but draughts were forthcoming from Portsmouth, and could also, if necessary, have been drawn from Devonport. Portsmouth furnished just over 2000 men, Devonport 1700, and at both of these depôts a considerable reserve of men was still available. Including the crews for the Grafton and Theseus (commissioned on the 9th July), the total number of active service men mobilised for specially commissioned ships was about 6800, while in addition the reserve ship complements had to be increased to fighting strength on the usual system, and by the aid of the coastguard. The useful experiment of 1891 of inviting Royal Naval Reserve men and officers to embark for the manœuvres was repeated, with entire success. Six hundred reserve men were distributed among the battleships and cruisers, of whom 250 were of the first class and 250 of the second class, and 100 were firemen. In the absence of the usual official report on the manœuvres, there is no sufficient means of judging how the R.N.R. men acquitted themselves. The *Times*' correspondent on board the Warspite wrote as follows: "The Royal Naval Reserve man does not take kindly to coaling ship or pulling an oar in a boat. . . . . He has no change of clothing, and looks a miserable object in wet weather, the reason being that he prefers to pocket his thirty shillings and get wet."

Embarkation of R. N. R.

It seems probable that the above estimate of the utility of the Reserve man may have been framed upon insufficient data. The dirty

appearance of a few of the men may have influenced the judgment of the writer, but he was right in suggesting that all Reserve men embarked for the manœuvres should be required to provide themselves with a change of clothing. In this connection, it may be pointed out that the First Lord of the Admiralty spoke as follows with regard to the efficiency of the men embarked for the manœuvres of 1894: "Provision was again made to embark 500 men for the naval manœuvres, and many more than that number volunteered for service. They were embarked in forty different ships, and on the whole, good reports were received both as regards conduct and efficiency." Prior to last summer no Royal Naval Reserve fireman had been embarked for the manœuvres, and this new departure was a noteworthy feature of the mobilisation scheme. Twelve lieutenants, Royal Naval Reserve, seven sub-lieutenants, and two midshipmen were also appointed to ships for the manœuvres. It would appear desirable to employ a larger number of junior officers of the Reserve during these annual exercises.

To sum up these brief observations on the *personnel*, the mobilisation of 1895 unquestionably indicated improved organisation at the Naval ports, especially for the prompt supply of petty officers, seamen, artificers, and stokers. This has been rendered possible by the recent additions to the active list, of which the Navy is already feeling the benefit. Men of all branches were forthcoming to man the ships, and a surplus remained at the depôts and coastguard stations which would have sufficed to commission many additional vessels. The approximate number of officers and men taking part in the manœuvres was 15,000.

Assembly of the squadrons.

The assembly of the squadrons was effected with creditable rapidity, and there were few delays calling for notice. The Channel Squadron, under Vice-Admiral Lord Walter Kerr, was already at Portland prior to the mobilisation, and was quickly reinforced by ten mobilised cruisers and six torpedo gunboats. Rear-Admiral Alington, second in command, continued to fly his flag in the Empress of India. This squadron of twenty-three vessels put to sea for the preliminary cruise on July 29, and anchored in Berehaven on August 3. The Reserve Squadron, under Rear-Admiral E. H. Seymour, C.B., with Rear-Admiral H. L. Pearson second in command, assembled in Tor Bay and also put to sea on July 29, but short of the cruiser Melampus and the torpedo-gunboat Renard. The former was delayed at Devonport by a defective windlass, the latter through engine defects, but both vessels joined the squadron during the preliminary cruise to Lough Swilly. The assembly of the Torpedo Squadron at Plymouth was marked by the development of minor engine defects in several of the small craft. The destroyer Rocket developed leaks in her boilers

which delayed her departure; the destroyer Dasher was disabled by collision with a mud dredger and had to be replaced by the Contest; the destroyer Dragon developed leaky valves, and three of the torpedo-boats met with minor mishaps. In consequence of these accidents and defects Rear-Admiral Wilson, V.-C., commanding this squadron, left Plymouth on the morning of July 28, short of four destroyers and one of his torpedo-boats. The absentees subsequently joined his flag at Milford Haven. These were the only defects developed by the mobilised vessels, and all the squadrons put to sea very promptly. Experience has shown that it is almost impossible to guard against the development of engine defects of a minor character, and this year they were fewer than usual.

Preliminary cruises. Between July 29 and August 3 the Channel and Reserve Squadrons carried out the exercises and tactics notified in the Admiralty order. Both fleets put into port *en route* to their bases in order to exercise the crews in anchoring and weighing, and at sea the squadrons performed fleet evolutions at various speeds, and the cruisers were exercised in scouting and distant signalling. According to custom, the newly-formed crews were constantly drilled at general quarters, fire quarters, collision stations, etc., and appear to have acquitted themselves creditably. In the Channel Squadron the captains were exercised at fleet evolutions of a more complicated character than those attempted in the Reserve Squadron, Lord Walter Kerr resorting to the system of "forming and dispersing" as well as to the simpler method of executing movements at "equal speed." It was found that the newly-commissioned vessels executed these manœuvres accurately after a little practice. The importance of these tactical exercises was thoughtfully and very ably criticised by an "occasional correspondent" of the *Times* as follows:—"Here is no mere question of signal books and giving certain words of command. All the conditions vary constantly; judgment is needed at every moment; the education of the eye in estimating distances, and exact knowledge of the capabilities of the ship are called for. The mere theorist will, in fact, find himself hopelessly incompetent, and the efficient handling of a ship implies qualities which it is not given to everyone to acquire. It is an art rather than a science, and its possession largely determines the fighting capabilities of a navy. An army may drill with mathematical precision, like that of Prussia in 1806, but may yet be deficient in essential military attributes. A fleet which can be freely manœuvred at high speed may be trusted to give a good account of itself in all circumstances. Herein lies the value and the significance of the 'exercises of 1895.'"

During the preliminary cruises some important experiments were

made in long-distance signalling, the results of which were valuable. The Royal Sovereign and Blenheim had been supplied with a new description of masthead semaphore, the invention of Admiral Wilson, and other vessels were supplied with collapsible drums, invented respectively by H.S.H. Prince Louis of Battenberg and Admiral Fane. The Wilson semaphore gave very good results, as it was found that messages could be signalled by it in clear weather to a distance of eleven miles. With the Fane drum, signals were distinguished at a distance of thirteen miles in clear daylight, but the drums were not manageable and were liable to evade control. By an ingenious arrangement the Battenberg drum was illuminated for night-work by twenty-six lights each of fifty candle-power, but the signals could not be transmitted with certainty, and both drums were generally regarded in the fleets as partial failures. Thus, the masthead semaphore was found, on the whole, the more effective invention of the three, but it was only available for day signalling, whilst its range was also strictly limited. The need of an effective apparatus for transmitting long-distance signals by night was generally acknowledged. Experiments with electric flashing lights at the masthead were partially but not wholly successful, yet it is considered probable that this system of signalling may possibly be developed so as to produce more satisfactory results. Meanwhile the old-fashioned flashing lamp holds its own against all newer inventions for night signalling by the Morse code. The difficulty of communicating rapidly with the scouts of the fleets was found embarrassing by both admirals. In daylight, communication between the fleet and its scouts was effectively carried on by means of a new code of signals said to have been favourably reported upon. Large-sized ensigns were suspended between the masts in certain positions prearranged to indicate certain meanings, and a fair variety of combinations was thus obtainable. This method was based upon the principles of the code of distant signalling which was in general use in the navy in the days of sails. In both fleets experiments were made in scouting formations, the cruisers being extended on plans previously arranged by the admirals. In one rather effective formation the cruisers of the Reserve Squadron were spread out ahead of the main body in the shape of an open fan, the base of which was eight miles distant from the flag-ship, and with a gunboat forming the link of communication. In this formation the admiral had a cruiser on each bow, twenty miles off, and the scouts were within signalling distance of one another. Various other formations were also tested in both squadrons during the preliminary cruises, and the practical experience thus gained was valuable. It is also worthy of note that the Channel Squadron cruisers had their

Signalling experiments.

funnels painted with black bands, and that by the arrangement adopted the admiral was enabled to identify any of his scouts at long distances. The 1st division of scouts was distinguished by a single band, the 2nd by two, the 3rd by three, and the individual ships of each division could be recognised by the position of the band or bands on one or both funnels. No serious engine defects were developed in either squadron during the preliminary cruises.

Coaling the squadrons.

Arrived at their respective bases, the squadrons replenished their coal-bunkers from the steam-colliers chartered by the Admiralty. It was found that the newly-commissioned ships coaled with less rapidity than those permanently commissioned, while of the mobilised ships themselves some coaled slower than others. The Royal Sovereign, for example, took in 280 tons in five hours, an average of 56 tons an hour, and the Empress of India coaled at the rate of 71½ tons an hour. The cruiser Endymion, permanently in commission, coaled at the rate of 45 tons an hour, while her sister ship Theseus (a mobilised vessel) coaled at the rate of only 24 tons an hour. In the Reserve Squadron the ships also coaled at very different speeds. The Benbow took in 15 tons an hour, the Dreadnought 35 tons, and the Alexandra 26 tons. The Colossus took 25 tons an hour, and her sister ship Edinburgh 19 tons. These figures are instructive, and indicate the enormous importance of efficient coaling arrangements in time of war. It is certain, however, that newly-commissioned ships of all types require more time for coaling than those which enjoy the great advantage of experienced crews.

The tactical problem.

The preliminary cruises having terminated, and the squadrons having coaled, the second phase of the tactical exercises should have commenced on the 8th August. Bad weather, however, delayed the departure of the squadrons till the morning of the 9th. The admirals had been directed to quit their bases simultaneously, and to steer in the first instance for specified rendezvous. Neither admiral had any knowledge of the direction to be taken by the other squadron, and each, on arrival at his rendezvous, was enjoined to do his best to effect a junction. The problem appeared likely to afford valuable experience in the use of scouts, and it seems to have been generally anticipated by the officers of the squadrons that such would have proved the case. The Channel Squadron left Bantry Bay at 9 A.M. on the 9th August, and shaped course for its rendezvous or secret position. This proved to be in lat. 53° 30′ N., and long. 17° 30′ W., or as nearly as possible 300 miles north-west of Berehaven. Lord Walter Kerr ordered a speed of 10 knots, and the Channel Squadron consequently reached its rendezvous at 6 P.M. on 10th August.

Admiral Seymour, with the Reserve Squadron, left Lough Swilly at

10 A.M. on August 9th. His appointed rendezvous was in lat. 54° 40′ N. and long. 15° 30′ W.—a position only 99 miles distant from the rendezvous assigned to the Channel Squadron. To reach its rendezvous the Reserve Squadron had to steer a little to the southward of West for a distance of 300 miles from Lough Swilly. The speed was also 10 knots, and but for a sad accident both squadrons would have reached these closely-adjoining points simultaneously. As it happened, the Reserve squadron was delayed for an hour at starting, and subsequently for four and a-half hours, owing to the loss of two men of the Edinburgh, who unfortunately fell overboard and were drowned. On resuming its course, the Reserve squadron proceeded at its maximum speed of 11 knots, and ultimately reached its assigned position at 8 P.M. on 10th August. It should be mentioned that the Admiralty gave no directions as to the speeds to be maintained by the squadrons while proceeding to their respective rendezvous. Their lordships merely indicated that the scouting was to commence as soon as each squadron reached its rendezvous.

In estimating the probable position of the squadron for which he was to search, each admiral, it will be seen, was forced to work largely upon assumption. Both appear to have correctly assumed certain probabilities, and their assumptions may be traced with some degree of accuracy by considering the plans they actually adopted. These plans differed materially as regards the disposition of their scouts, but both admirals unquestionably assumed that the area of operations was likely to be much restricted. As the event proved, they were right in this assumption; yet the Admiralty, had they chosen, could easily have despatched the squadrons to widely-separated points. The assumption that both squadrons would have to steam an equal or approximately equal distance before reaching their rendezvous was apparently common to both admirals, and yet there was little support for such a theory. The Channel Squadron, having the greater speed, might well have been ordered to a more remote point than the Reserve Squadron. Then again, Admiral Seymour had no information as to the time or even date at which Lord Walter Kerr would reach his rendezvous; and, *vice versa*, Lord Walter Kerr was ignorant of the distance to be traversed by Admiral Seymour. But even on the assumption of equal speeds and distances, it is obvious that the Reserve Squadron's rendezvous might have been fixed in the vicinity of the Hebrides, or at least well north of Ireland, and that the Channel Squadron might have been despatched to some point south of Berehaven. All that was definitely known was that the operations were expected to end on the 14th August. There was a reasonable presumption that neither squadron would be sent to the

Irish Channel, on account of the separate manœuvres of the Torpedo Squadron, and hence that both would be cruising in the Atlantic. Beyond this there were no positive data.

The Channel Fleet tactics.

For reasons of his own, certainly justified by results, Lord Walter Kerr assumed that the Reserve Squadron would be found within a certain area. The assumed area was in the form of an open fan, of which the handle may be said to have been laid down at the original rendezvous of the Channel Squadron. From this point the sticks of the fan, represented by the radiating tracks of the scouts, extended to distances varying between 210 and 275 miles, and from N. to S.E. By this method of scouting, it will be seen that a very considerable area was completely covered by the scouts, and it will also be observed that the scouts were widely scattered and separated from the battle squadron. Each of the twelve cruisers had separate courses radiating from the rendezvous, and these practically covered the whole of the area to be examined during the first experiment.

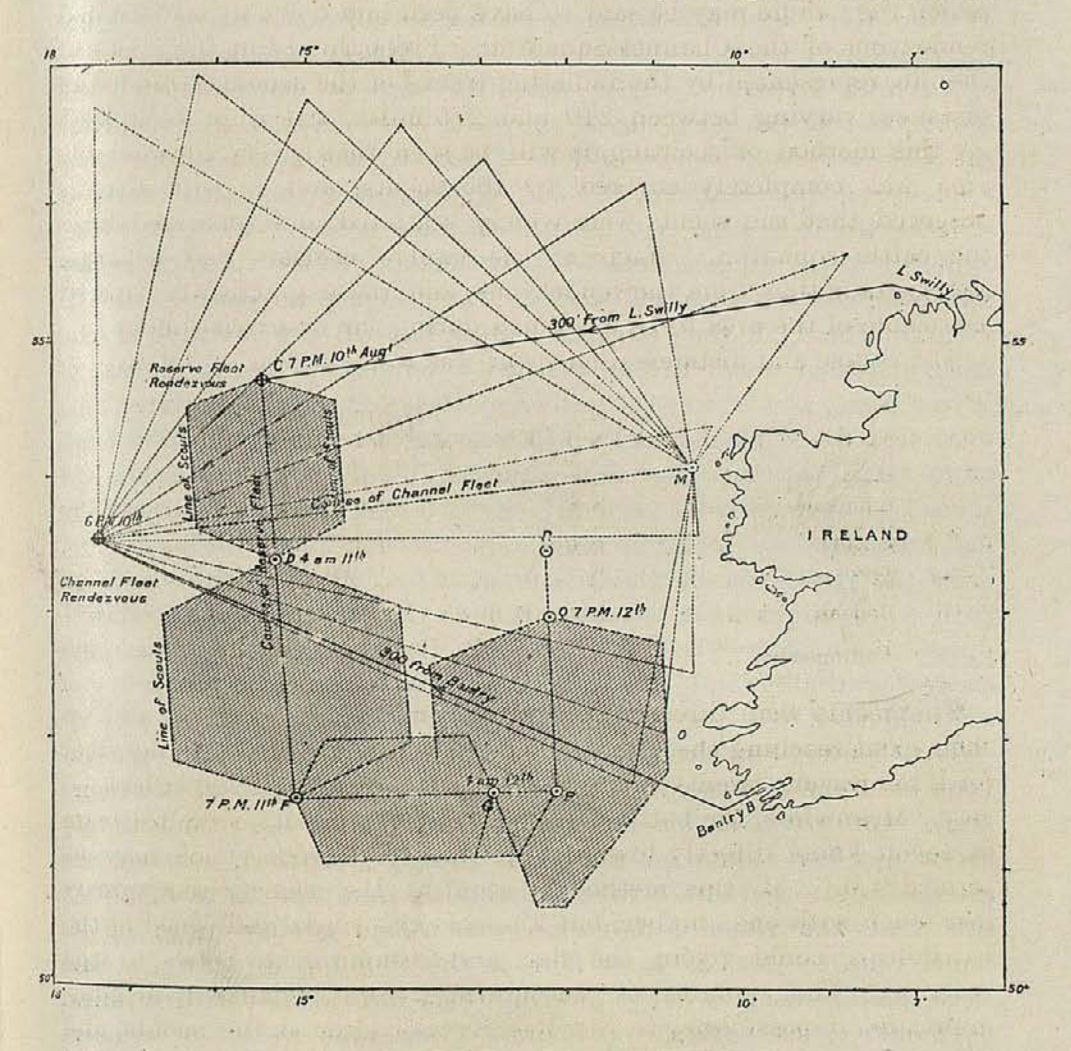
The course and distance each scout was to make was as follows:—

Charybdis	N.	210 miles
Apollo	N. by E.	230 "
Latona	N.N.E.	240 "
Forte	N.E. by N.	250 "
Iphigenia	N.E.	260 "
Indefatigable	N.E. by E.	270 "
Speedy	E.N.E.	275 "
Jason	E. by N.	To Eagle Island
Niger	E.	To Slyne Head
Bellona	About E. by S.	To the Shannon
Pearl	" E.S.E.	To the Blaskets
Andromache	" S.E.	Towards Fastnet Light

The scouts were directed to steam from 14 to 15 knots, and on each scout reaching the limit of her cruise she was to turn and steer for a rendezvous twenty miles west of Blackrock Light, off Blacksod Bay. Meanwhile, the battleships, with three gunboats, were to steam at seven knots directly towards the new rendezvous which may be termed "M." By this method of scouting the cruisers temporarily lost touch with one another, but knowing the course and speed of the battleships, could rejoin the flag and communicate news to the Admiral. The captains of the cruisers were instructed to communicate, if possible, with the Reserve Squadron or its scouts, and thus to inform Admiral Seymour of the position of the Channel Squadron. The captains would also ascertain the position of the Reserve battle squadron, and then rejoin the Channel Squadron at full speed. By this method the whole Channel Squadron would ultimately have united at the rendezvous "M," and the same tactics could, if necessary, have been repeated over another wide area.

The method of scouting adopted by Admiral Seymour was entirely

different. It was evidently designed for use under conditions of actual warfare, and to maintain touch between the battleships and scouts. The battleships were formed in two columns, and the scouts were stationed on each beam and slightly ahead, in such formation as to cover a breadth of 60 miles by night and 110 miles by day. The two columns of battleships were connected by two gunboats stationed Admiral Seymour's tactics.



between them. A group of four cruisers was disposed on the starboard hand of the squadron, within possible signalling distance of one another, and a similarly formed group of scouts was disposed to port. Outside these groups of cruisers were four more scouts, two on either beam. At night these latter were ordered to steer outwards from the squadron for 26 miles, and then a parallel course to the battleships for 60 miles, subsequently steering inwards so as to rejoin

the fleet. In the daytime the distances between the scouts were virtually doubled. Thus, the four outermost scouts alone were temporarily out of touch with the squadron, and these were to rejoin the fleet every twelve hours. The instructions to the captains of the scouts, working in pairs, were that in the event of sighting a ship of the Channel Squadron one vessel was to communicate with Lord Walter Kerr, and the other to return to Admiral Seymour with information.

Admiral Seymour's assumed area.

Admiral Seymour, judging from the narrow disposition of his scouts, and by the plans made known to the squadron, assumed that the Channel Squadron would be found to the south of his own rendezvous, and between 16° 30′ W. long. and the Irish coast—a strictly limited area. It should be remembered, however, that Admiral Seymour considered himself bound by the rules to maintain close contact with his scouts. He designed to steer south till 7 P.M. on the 11th, then towards Bantry Bay till the morning of the 12th, and then north till he reached a rendezvous nearly abreast of Slyne Head, and about 120 miles to the west of that point. The total area to be thus examined in forty-eight hours would have been more restricted than the area examined by the Channel scouts in seventeen hours. It is perfectly obvious that if Lord Walter Kerr had felt bound to maintain similarly close relations with his scouts, or if the rendezvous had been separated by 300 miles, the search on both sides might have been carried on for several days before a junction would have been effected. As it happened, the plans succeeded admirably, and this was largely due to the close proximity of the rendezvous.

How the junction was effected.

The Channel Squadron, it will be remembered, reached its rendezvous at 6 P.M. on August 10th, and the Reserve Squadron two hours later. On arrival at his rendezvous Lord Walter Kerr immediately threw out his scouts on the plan already described, so that the cruisers began to radiate in all directions from due N. to S.E. At this time the Reserve Squadron was within twenty miles of its rendezvous, so that at least four of the Channel Squadron scouts were steering courses likely to bring them into contact with Admiral Seymour's fleet within six hours. These four were the cruisers steering N.E., N.E. by E., E.N.E. and E. by N. It chanced that the course of the Iphigenia would have taken her almost exactly over the rendezvous of the Reserve Squadron. Meanwhile the Channel battleships altered course to the eastward, and proceeded at 7 knots speed towards Blackrock Light.

Arriving at his rendezvous at 8 P.M., Admiral Seymour spread out his cruisers in the formation already described, and altered course to

south. The squadron covered a front of about sixty miles. The two battle squadrons, steering respectively south and east, would not actually have sighted each other without scouting, but at midnight they arrived within about twenty-five miles of each other, and as a matter of course, the Channel scouts sighted the Reserve Squadron. This occurred shortly after midnight when the Iphigenia and Jason actually crossed the extended front of the Reserve Squadron. These scouts communicated with Admiral Seymour, informed him of the position and new rendezvous of the Channel Squadron, and then proceeded to rejoin their flagship. The junction was thus virtually established within six hours of the commencement of the search; but as it was unnecessary to join the fleets during the night, Admiral Seymour altered course and proceeded at slow speed towards the rendezvous off Blackrock Light. Next morning the two squadrons actually united, and were joined in due course by the cruisers of the Channel Squadron.

Conclusion to be drawn.

Under the conditions of the problem little could be learned, for the junction was practically inevitable. This was chiefly due to the close proximity of the rendezvous assigned by the Admiralty to the Channel and Reserve Squadrons. Even if Admiral Seymour had steered north instead of south, the Channel Fleet scouts must have sighted him before morning. Under the circumstances, it is to be regretted that the problem was rendered so simple, as a greater distance between the squadrons would probably have afforded useful experience. Had the squadrons started from points 300 miles apart, the difficulties of successful scouting would have been greater, and the results correspondingly interesting to naval officers. The principal tactical exercise of 1895 was a solution of the obvious, and yet this was partly due to the extent of the area covered by Lord Walter Kerr's scouts. One Admiral had no hesitation in scattering his scouts, and thus losing touch with them for many hours; the other may almost be considered to have unduly restricted his area of search. These, however, are difficult questions, and it must be remembered that the instructions to the Admirals have not been made public in full detail. Admiral Seymour appears to have considered it imperative to keep his scouts in contact with the battle squadron, and there is something to be said in favour of this method of scouting under the conditions of war. The Channel scouts, on the other hand, were despatched so far afield that some of them would have remained absent from the battle squadron for more than thirty hours. It is not very profitable to consider what might have happened under imaginary circumstances, yet it may be fairly argued that if the rendezvous had been fixed 300 miles apart the scouting adopted would

presumably have failed—at least in the first essay—and might then have been repeated or altered with really valuable results. It would have been quite feasible, for example, for the Admiralty to have separated the rendezvous of the squadrons by 300 miles without directing either fleet to have steamed a greater distance from its base. In that case, the fan-shaped area examined by the Channel scouts would not, under certain conditions, have proved sufficiently extensive, whilst Admiral Seymour's dispositions would have failed to produce any more definite results than the examination of a very limited area. For these and other reasons upon which it is needless to enlarge, it will be obvious to naval experts that the manœuvres of 1895 failed to throw much light upon a tactical exercise which might have proved very interesting under more intelligent conditions. They have merely proved that two British squadrons placed within ninty-nine miles of each other may be expected to effect a junction within a few hours. On the other hand, there can be no question as to the value of the operations generally, which afforded a great deal of instruction and good practice in ordinary fleet evolutions. The partial mobilisation is in itself an invaluable exercise, and it is by no means imperative that strategical problems should be annually studied to the exclusion of tactical exercises.

Concluding exercises. It is unnecessary to dwell at length upon the useful evolutions of the squadrons after their junction on the 11th August. As prearranged, the fleets remained in company till the 14th August. The sixteen battleships carried out fleet manœuvres very creditably, and the signalling was particularly smart in view of the size of the squadron. As an example of this it may be mentioned that when the battleships were manœuvring in four columns, with intervals of eight cables between each column, the flagship's signals were frequently answered by all the ships in less than thirty seconds. The cruisers of the two squadrons were not combined for exercises after the junction, but continued to execute independent scouting tactics, each light squadron under the orders of its own admiral. These exercises were continued, as well as the signalling experiments and general drills, during August 12th and 13th, and while the whole flotilla was steaming south. On August 14th the two squadrons separated and subsequently dispersed for target practice. Cordite powder was used in some of the ships, and it was not found to affect the muzzle velocity of the guns, in spite of the varying temperatures in the ships' magazines. The Royal Naval Reserve men were exercised at target practice and acquitted themselves creditably. The squadrons subsequently returned to Portland and Tor Bay, and the mobilised ships and crews having been inspected, returned to their ports and were paid off.

THE TORPEDO SQUADRON MANŒUVRES.

The manœuvres of the Torpedo Squadron were quite distinct from those of the Channel and Reserve Squadrons, and can therefore be separately considered. I am largely indebted to the " unauthorised correspondents " of the Press, and especially to those of the *Naval and Military Record*, for the following facts, whilst the very few conclusions I have ventured to draw are advanced with due caution.

The Torpedo Squadron, the composition of which has already been given on page 177, was under the command of the well-known torpedo expert, Rear-Admiral A. K. Wilson, V.C., and assembled at Plymouth. The destroyer Dasher met with an accident, and was replaced by the Contest prior to the commencement of the manœuvres. The minor engine defects, which somewhat delayed the preliminary exercises, have already been alluded to. It suffices to remark here that the engine-room ratings necessarily lacked experience of the individual peculiarities of their vessels, and that most of the defects were traced to this cause. Admiral Wilson's squadron, still incomplete, left Plymouth at 4.30 A.M. on 28th July, and arrived at Milford Haven at 7.30 P.M. The average speed *en route* did not exceed 11 knots, but some of the boats dropped behind. It may be added here that although there was some delay in assembling the boats and destroyers, the subsequent manœuvres were not marred by the development of serious engine defects. Admiral Wilson organised his torpedo flotilla for tactical purposes into two divisions, each consisting of two subdivisions as follows :—

FIRST DIVISION.

1st Subdivision.	*2nd Subdivision.*
Hermione (flag)	Havock
Daring	Boxer
Bruiser	Contest
Decoy	
Torpedo boats, 95, 73, 81	Torpedo boats, 94, 72, 85

SECOND DIVISION.

3rd Subdivision.	*4th Subdivision.*
Fox	Shark
Ferret	Dragon
Rocket	Banshee
Torpedo boats, 83, 74, 86	Torpedo boats, 80, 79, 87

By this arrangement each subdivision had the same types of torpedo boats, and therefore practically the same speed. The destroyers, as well as the boats, were distinguished by numbers painted upon their bows. With the exception of the Havock and Hornet, no destroyers had previously taken part in the annual manœuvres, and the principal

object of the manœuvres of 1895 was to test the value of the destroyers in various ways. The large number of these vessels recently added to the British Navy rendered the importance of the tests additionally great. It will be remembered that in the manœuvres of 1894 torpedo-gunboats were utilised to protect the battleships from torpedo boat attacks, as indeed they had been in previous years. In this work the gunboats were successful, but their lack of speed rendered them inefficient as "catchers," and hence the evolution of the torpedo-boat destroyer. The twelve torpedo-boats at Admiral Wilson's disposal were the fastest of the type in the Navy, their full speed being between 19 and 20 knots in smooth water.

Manœuvres of squadron.

The various manœuvres to be carried out by the Torpedo Squadron may be summed up as follows:—

(1) Ordinary cruising at various speeds, with tactics, to accustom officers and men to the handling of their vessels and boats and their armaments.
(2) Spreading for scouting work and re-forming.
(3) Target practice at high speeds and special targets.
(4) Torpedo practice at high speeds.
(5) Tests of the capabilities of destroyers in blockading torpedo-boats.
(6) To ascertain how far the best torpedo-boats could prevent modern ships of war from using a channel with the opposite coast in the enemies' hands, and the value of destroyers as a protection to such ships.
(7) To ascertain to what extent it would be desirable to use destroyers as sea-going boats.

Preliminary experiments.

The preliminary experiments and exercises were carried on for several days after the arrival of the squadron at Milford Haven. The crews of the destroyers and boats were first practised extensively in the management of their vessels by the execution of tactical movements at high speeds. The relative speed of the destroyers and boats was also determined under various conditions. On August 8, for example, the destroyers and boats, after several hours' tactics, were subjected to the following experiment: At a distance of about forty miles from Milford Haven the torpedo boats were given twelve minutes' start, and were chased into port by the destroyers. The chase was over 11½ miles, and lasted about thirty minutes. No previous notice had been given of the test; at the time when the orders were given to chase torpedo boats, the squadron was steaming at eight to ten knots, and had just previously been stopped for an

hour, and the boats had to work up to their full speed during the twelve minutes' grace. Under these conditions the exact length of the start could not have been accurately estimated. The result was that only four boats succeeded in keeping ahead of the destroyers, the remainder being overtaken before reaching port. The highest speed logged by any of the boats was 19½ knots. The speed worked up to by the destroyers was 26½ knots, and the average speed for the whole distance of the first six destroyers was 21 to 22½ knots. Some of the boats broke down during the race, and also two of the destroyers. The fan-engines of the latter, and also their condensers, gave some trouble during the manœuvres. The above experiment may be regarded chiefly as a test of engine-driving, as of course the destroyers were well known to be superior in speed.

Target practice.

Some novel experiments in target practice were carried out by the destroyers. The cruisers Hermione and Fox towed specially constructed targets at a good rate of speed, and these, representing torpedo-boats, were fired upon by the destroyers with their quick-firing guns. By the method adopted the destroyers steamed down between the cruisers in the opposite direction, and passed the targets at a speed of about 30 knots. The firing under these difficult conditions is stated to have been very accurate in smooth water. It is obviously difficult, however, for any target in tow of a ship to accurately represent a retreating torpedo boat. The conclusion appears to have been formed that the destroyers made steady gun-platforms in ordinary weather, and that retreating torpedo-boats could be disabled with certainty by skilful gunners. In moderately rough water the shooting was far less accurate, but still good. Each destroyer was allowed the full quarterly allowance of ammunition—120 rounds. All the destroyers were also exercised in discharging their torpedoes at a mark when steaming between 20 and 23 knots. The practice with the Whiteheads was also accurate.

A blockading experiment.

During the last week of the manœuvres some interesting experiments were made with the object of determining whether destroyers could successfully blockade torpedo-boats in their ports, and prevent them from issuing out to attack a squadron. The following is the substance of a memorandum issued by Admiral Wilson in explanation of the plan of operations:—"One of the auxiliary ships will take up a position ten miles from the mouth of the harbour to represent the ships of a blockading squadron. She will be supported by a subdivision of destroyers which will cruise between her and the shore so as to intercept torpedo-boats making any attempt on the blockading squadron. The shore being enemies' country, the destroyers may not approach the land within half a mile, nor within

the red sector of St. Ann's Light. A subdivision of torpedo-boats will, at some time during the night, attempt to pass the destroyers and attack the blockading squadron." Various other rules were also included in the memorandum. The ship representing the squadron was not able to put the boats out of action, the special object of the manœuvre being to test the value of the destroyers. A single destroyer overhauling a single boat was to be held to have sunk the latter, but an equal number of destroyers was needed under the rules to destroy a group of boats. It should be added that the boats, if pursued by destroyers, were not permitted to dodge, but were required to keep a straight course. The boats had not only to evade the blockade of the destroyers, but were also expected to creep back to port unperceived after making their attack upon the squadron. No accurate information is obtainable as to the results of this experiment, but it will be seen that the torpedo-boats were heavily handicapped under at least one of the above rules. Boats chased at night by destroyers would naturally dodge their pursuers. On the other hand, another rule was unfavourable to the destroyers. A group of three boats could not be put out of action by less than three destroyers. These, it will be admitted, were artificial conditions, and in the absence of an official report no conclusions can safely be drawn from the results. In point of fact all the torpedo-boats concerned in the attack were put out of action. They merely succeeded in issuing out of port, and not in torpedoing the squadron. The vessels employed in this experiment were the destroyers Daring, Bruiser, and Decoy, acting against three boats.

A speed test.

On the same night another experiment was made with the destroyers Havock, Boxer, and Contest. These vessels were anchored in Whitedole Bay, and three torpedo-boats were sent past their anchorage at full speed. Directly the boats had passed the destroyers were permitted to raise their anchors and start in chase. The boats had only to reach St. Goven's Head to obtain shelter, but in this case all three were overtaken.

The final experiment.

The final experiment undertaken by Admiral Wilson was designed to determine the value of destroyers as a protection to a squadron passing through the St. George's Channel, the assumption being that the Irish coast was hostile territory providing bases for the torpedo-boats. The torpedo-boats quitted Milford Haven prior to the commencement of hostilities, and were distributed at Wicklow and Howth. Owing to accidents there were only ten boats available for the operations. The Curlew and Landrail operated with the boats, while the Hermione and Fox, under Admiral Wilson, represented a squadron protected by the twelve destroyers. Admiral Wilson's objects were to proceed

with his squadron from Milford to Carlingford, and to capture or destroy the opposing boats. The boats were entitled to use several ports of the Irish coast, but none on the Welsh or English coasts.

The rules of the war were briefly as follows:—The Hermione and Fox could put out of action the whole or any portion of the opposing flotilla, including the Curlew and Landrail, and could themselves be torpedoed by the flotilla under the usual rules of peace manœuvres. If so torpedoed, the cruisers were to continue to represent a squadron until the close of the operations. Under certain conditions the Curlew or Landrail could put out of action any or all of the destroyers, but could not themselves be put out of action by any combination of destroyers. Three torpedo-boats could put one destroyer out of action, while two destroyers acting in concert could capture a group of three boats. Lastly, a very important rule of the game was that boats under convoy of the Curlew or Landrail could not be attacked by destroyers. **Rules of the war.**

Hostilities commenced at 10 P.M. on August 11th, and were planned to conclude at 4 A.M. on the 13th. On the morning of the 11th the destroyers left Milford Haven and proceeded to blockade the boats in their ports. The Hermione and Fox put to sea at 10 P.M. It was a dark night, with showers of rain, and a slight sea was running. The boats at Howth experienced no great difficulty, owing to the darkness, in evading the blockaders, and, joining the Curlew at a prearranged rendezvous, they effected an entrance into Wicklow. Here the flotilla remained till nightfall on the 12th, secure from attack. During the first night the Hermione had put the Landrail out of action, but in so doing had sacrificed the Daring. The Landrail came into contact with the squadron whilst scouting, was chased, and took refuge behind a sandbank. The Daring was ordered to sound the Channel, and in so doing was put out of action. On the night of the 12th the destroyers were watching Dublin Bay and Wicklow, and so far none of the boats had been destroyed. The night being again dark and the weather fine, the boats endeavoured to leave their ports. Five of them were put out of action in the attempt, and others were also claimed by the destroyers on less conclusive evidence. No. 94 escaped by a ruse, disguising herself as a destroyer by fitting up an additional funnel. The boats which evaded the destroyers claimed to have succeeded in torpedoing the Hermione, but it is understood that the claim was disallowed. The Torpedo Squadron re-assembled at Milford Haven on the 13th and subsequently returned to Plymouth. **Events of the war.**

Owing to the confidential character of these highly interesting manœuvres, it is impossible for unofficial critics to draw definite con- **The value of destroyers.**

clusions as to the value of the new destroyers. Commenting upon this point in a leading article, the *Times* observed: "The torpedo-boat destroyers employed in these confidential operations are a new and so far an untried weapon of naval warfare. It is far easier to shake confidence in their capacities and performances than to restore it; and undue secrecy is almost certain to shake it. We sincerely hope that no such untoward consequences will arise from the policy of mystery adopted by the Admiralty in regard to the torpedo operations of this year."

The ability to work up to a high speed in a short time must be considered one of the essential features of a destroyer, which is due to water-tube boilers. None but water-tube boilers could have stood the sudden increase from 600 I.H.P. to between 3000 and 4000 I.H.P. which was necessary in the chase of torpedo boats described above.

The officers taking part in the operations were expressly enjoined to regard them as confidential, and all documents relating to the manœuvres were returned to the Admiralty. There is reason to believe, however, that the manœuvres have satisfied the authorities of the great value and importance of destroyers, and that the same view was formed by many experienced officers. I venture to quote the following brief extract from a letter written by a very capable naval officer who took part in the operations of the Torpedo Squadron: "The impression left on my mind," he writes, "by the manœuvres was that all the present types of torpedo boats are obsolete, and that probably no more will ever be built. But I believe that boats of the size of the destroyers will take their place in every Navy, and that a competition as regards the numbers owned will begin. In this coming competition England seems to enjoy the advantage of a start." This criticism, brief though it is, may be of greater value than many pages of comment based upon inadequate information.

CHARLES GLEIG (late Lieut. R.N.)

CHAPTER XII.

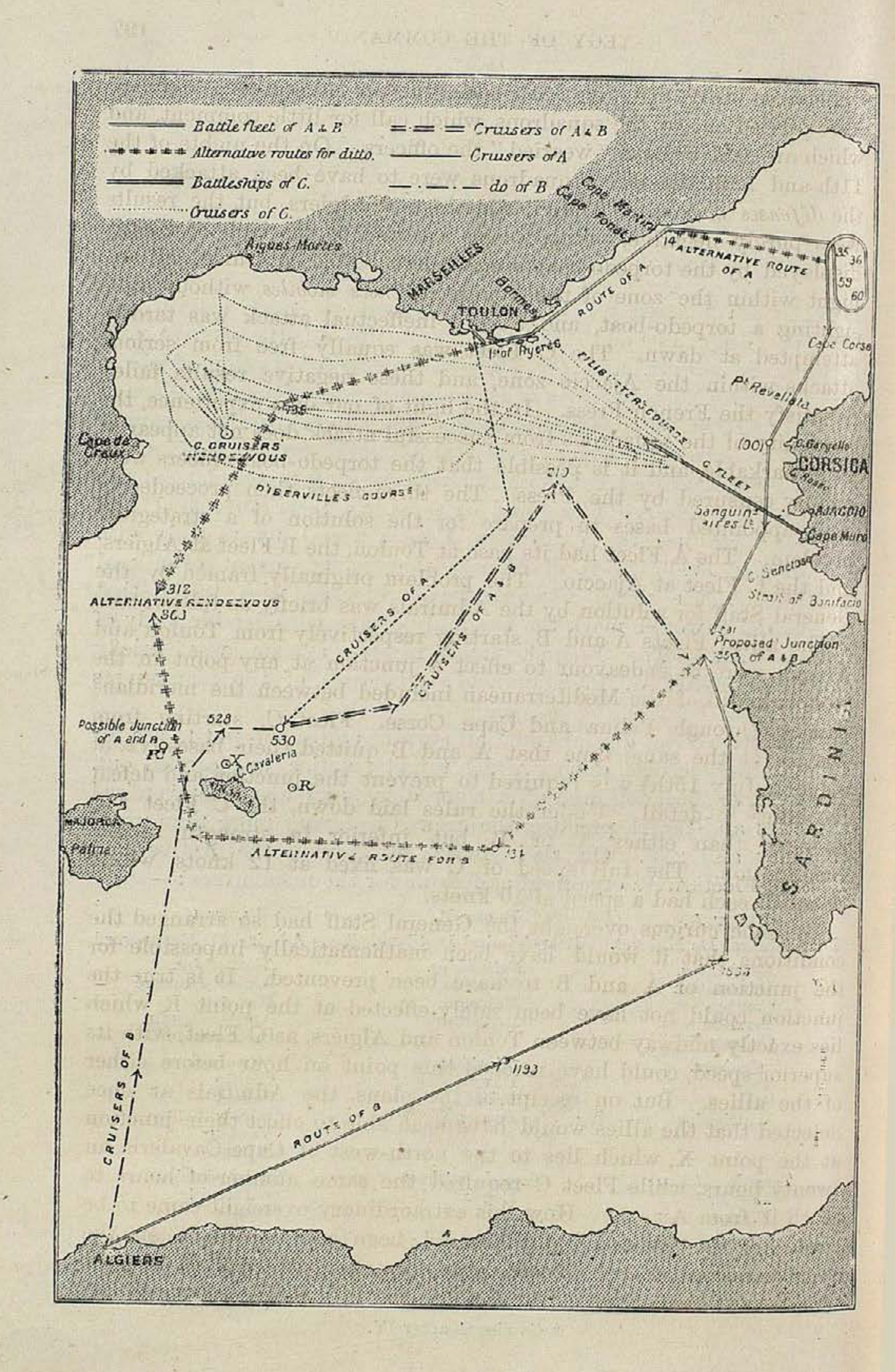
The French Manœuvres in the Mediterranean.

The French manœuvres in the Mediterranean were carried out between July 1st and 27th, by the ships of the Active and Reserve Squadrons, and the *défenses mobiles* of Toulon, Ajaccio, and Algiers. No battleships or cruisers were specially commissioned to take part in the operations, so that the summer of 1895 cannot be said to have afforded any real test of naval preparation. Only 450 Reserve men were called out for training and to supplement the crews of the Reserve Fleet, and of these no more than 390 had "rallied" (to use the expressive French term) up to July 6th. *La Marine Française* is of opinion that, in the event of a real mobilisation, the railways would be so blocked with traffic that serious delay would mark the assembly of any considerable body of reserve men. The French naval reserve system was briefly explained in Mr. J. R. Thursfield's criticisms of the manœuvres of 1891.*

The Active Fleet disembarked all surplus stores and put to sea for a preliminary cruise, during which target practice was carried out. The Reserve Fleet followed after some delay, and was also exercised at tactics and target practice, the crews displaying more than usual efficiency and zeal. On their return to Toulon the Active and Reserve Fleets were organised as follows for the manœuvres :—

Fleet A.	Fleet B.	Fleet C.
Rear-Admiral De Maigret.	Rear-Admiral De Slane.	Rear-Admiral De Beauregard.
Battleships.	*Battleships.*	*Battleships.*
Dévastation	Magenta	Amiral-Duperré
Courbet	Neptune	Marceau
Terrible	Redoutable	Amiral-Baudin
Caiman		Indomptable
Cruisers.	*Cruisers.*	*Cruisers.*
Tage	Davout	Cécille
Sfax	Troude	Suchet
Wattignies	Faucon	Forbin
		Vautaur
		Milan
Torpedo-catchers	*Torpedo-catchers.*	*Torpedo-catchers.*
Levrier	Leger	D'Iberville
Fleche		Bombe
Torpedo-boats (sea-going)		*Torpedo-boats (sea-going).*
Sarrazin		Flibustier
Argonaute		Kabyle
Eclair		Audacieux
		Orage

* *Cf.* also Chapter IV.


Battle fleet of A & B
Alternative routes for ditto.
Battleships of C.
Cruisers of C.
Cruisers of A & B
Cruisers of A
do of B
Aigues-Mortes
MARSEILLES
TOULON
Bormes
Cape Martin
Iˢ of Hyeres
ROUTE OF A
ALTERNATIVE ROUTE OF A
14
35
36
59
60
Cape Corse
Pᵗ Revellata
FILIBUSTERS COURSE
C FLEET
CORSICA
AJACCIO
Cape Muro
Sanguinaires Lᵗ
C. Senetosa
Strait of Bonifacio
Proposed Junction of A & B
D'IBERVILLE'S COURSE
C. CRUISERS RENDEZVOUS
Cape de Creux
195
210
312
ALTERNATIVE RENDEZVOUS
CRUISERS OF A
CRUISERS OF A & B
Possible Junction of A and B
528
530
C. Cavaleria
R
MAJORCA
Palma
ALTERNATIVE ROUTE FOR B
SARDINIA
1193
ROUTE OF B
CRUISERS OF B
ALGIERS

Between July 8th and 13th some further preliminary exercises were carried out by the squadrons, which call for little comment, and which are said to have "wearied" the officers. On the nights of the 11th and 12th the three squadrons were to have been attacked by the *défenses mobiles* of Toulon, Ajaccio, and Algiers, but the results were purely negative, owing, it was asserted, to the lack of energy displayed by the torpedo-boat commanders. Fleet A cruised all one night within the zone of the Toulon *défenses mobiles* without even sighting a torpedo-boat, and a very ineffectual attack was tardily attempted at dawn. The C Fleet was equally free from serious attacks within the Ajaccio zone, and these negative results failed to satisfy the French Press. In the light of our own experience, the immunity of the squadrons from successful attack does not appear at all remarkable, and it is possible that the torpedo-boat officers were unduly censured by the Press. The three fleets then proceeded to their appointed bases to prepare for the solution of a strategical problem. The A Fleet had its base at Toulon, the B Fleet at Algiers, and the C Fleet at Ajaccio. The problem originally framed by the General Staff for solution by the Admirals was briefly as follows:— **Preliminary exercises.**

The allied Fleets A and B, starting respectively from Toulon and Algiers, were to endeavour to effect a junction at any point in the western basin of the Mediterranean included between the meridians passing through Palma and Cape Corse. Fleet C, starting from Ajaccio at the same time that A and B quitted their bases (*i.e.* at noon on July 15th) was required to prevent the junction and defeat the allies in detail. Under the rules laid down, the C Fleet was stronger than either A or B, but inferior in strength to the combination. The full speed of C was fixed at 12 knots, whilst A and B each had a speed of 10 knots. **The problem.**

By some curious oversight the General Staff had so arranged the conditions that it would have been mathematically impossible for the junction of A and B to have been prevented. It is true the junction could not have been safely effected at the point R, which lies exactly midway between Toulon and Algiers, as C Fleet, with its superior speed, could have reached this point an hour before either of the allies. But on receipt of the plans, the Admirals at once detected that the allies would have been able to effect their junction at the point X, which lies to the north-west of Cape Cavaleria, in twenty hours, while Fleet C required the same number of hours to reach it from Ajaccio. How this extraordinary oversight came to be made by the General Staff has not been explained, but on the representation of the Admirals the mistake was rectified by the simple expedient of giving the C Fleet four hours start. Thus, C was

entitled to quit Ajaccio at noon on July 15th, whilst A and B were not to leave their bases till 4 P.M. The change converted a mathematical certainty into a strategic problem of real interest, involving careful consideration on the part of the admirals, and with its results largely dependent upon the efficiency of C Fleet's scouts.

Plans of the allies.

The plans for effecting the junction were arranged as follows between Admirals De Maigret and De Slane. On leaving Toulon, the battle squadron A, accompanied by its second division of cruisers, was to shape course so as to pass inside the Isles of Hyères, and then in a north-easterly direction hugging the coast as far as Cape Martin (position 14). The fleet was then to steer east till it reached almost the limit of the manœuvreing ground, and during the day of July 16th it was to remain within the circular space 35 36, 59, 60. At nightfall the fleet was to steer slowly south, and then along the coast of Corsica. On nearing Ajaccio, Admiral De Maigret was to ascertain whether Fleet C had quitted port, and was to send a scout to inform Admiral De Slane of the progress of Fleet A. If all went well, the A Fleet was then to push on to the rendezvous at position 381. The B Fleet, also with its second division of crusiers in company, was to steer in a north-easterly direction so as to reach position 1193 at 10 A.M. on July 16th, and continuing the same course was to reach position 1956 at 8 P.M. Then altering course so as to hug the west coast of Sardinia Fleet B was to reach the rendezvous at position 435 at 9 A.M. on July 17th. Here the junction was to be effected. An alternative route was also planned for both A and B, culminating at a rendezvous at positions 319 and 363. So far as B was concerned the alternative plan was this. If on arrival at the first rendezvous Fleet A did not appear, Fleet B was to wait at position 435 until midnight, unless put to flight by the enemy; and then, failing any fresh instructions, B was to steer for position 734, thence it was to steer westward, through the Majorca channel, and ultimately unite with A at position 363, between 8 P.M. and midnight on the 18th. Thus the movements of Fleet B, after reaching the first rendezvous, were to be dependent upon the success of Fleet A in evading the enemy.

The alternative route for A was to be resorted to if, on the morning of the 16th, Admiral De Maigret had reason to believe that his position was suspected by the enemy. In this event he was to return towards Cape Martin (position 14), and thence along the coast almost over his outward track. The Fleet would then make position 135 and thence to the second rendezvous. If obliged to adopt this alternative route Admiral De Maigret intended to warn Admiral De Slane of the change of plan and of his time of leaving the area 35, 36, 59, 60.

Scouts of A and B.

It was further planned between the allies that each squadron should detach three cruisers for scouting. The courses to be steered are shown on the diagram and can be briefly explained. The scouts of A were to steer S. 15° E. at full speed, and in company. They were to harass C's scouts or attempt a torpedo attack upon the enemy's battleships. Ultimately this division was to arrive at position 530, at 10 A.M. on July 16th, and effect a junction with the three cruisers of Fleet B. The detached cruisers of B were to steer through the Majorca channel, harass C's cruisers, and rendezvous at position 530. The combined light divisions were then to act as directed by the senior captain. This officer was instructed to attack, harass, or mislead C's cruisers, and to send information of the enemy's movements to Admiral De Maigret. He was also to mislead the battleships of C by any means in his power, and ultimately to reach the rendezvous of the allies. The proposed track of the combined light divisions is marked on the diagram, passing through positions 480 and 210.

The plans for C Fleet.

The plan arranged by Admiral De Beauregard for preventing the junction was as follows: at noon on July 15th, the whole C Fleet was to quit Ajaccio and steer at 12 knots towards Toulon. At 4 P.M. the Admiral was entitled to begin scouting, and the cruisers and sea-going torpedo boats were to increase speed and spread in assigned directions. The courses that were to have been followed are indicated in the diagram by dotted lines. Admiral De Beauregard intended to scout for the A Fleet till 7 A.M. on the 16th, and then if the search proved fruitless to disregard A and scout for B. It will be seen that C's scouts were to examine the whole section between the French coast and the outer curve of Fleet A's probable course. This outer curve was to be followed by the D'Iberville. The Admiral of C had seven cruisers and four "torpilleurs," to which the following courses were assigned.

Courses and Distances to be Made Good.

Times.	D'Iberville.	Suchet.	Cecille.	Milan.
4 to 8 p.m. . .	N 70 W at 18 k	N 35 W at 18 k To rejoin the line of scouts at 10 p.m.	N 59 W at 17 k	N 58 W at 16 k
8 to 10 p.m. . .	S 75 W at 17 k	. . . . . .	N 80 W at 12 k	N 73 W at 14 k
10 to Mid. . .	S 75 W „ 16 k	N 81 W at 14 k	N 86 W „ 14 k	West „ 14 k
Mid. to 2 a.m. .	N 85 W „ 16 k	N 87 W „ 13 k	S 86 W „ 13 k	S 86 W „ 14 k
2 to 4 a.m. . .	N 71 W „ 16 k	N 74 W „ 14 k	N 74 W „ 14 k	N 74 W „ 15 k
4 „ 5 „ . .	N 30 W „ 17 k	N 58 W „ 17 k	N 60 W „ 18 k	N 60 W „ 15 k
5 „ 6 „ . .	N 12 W „ 18 k	S 4 E „ 17 k	S 53 W „ 18 k	S 18 E „ 15 k
6 to rendezvous	S 44 E „ 18 k		S 37 E „ 18 k	

Times.	Forban.	Audacieux.	Vautour.	Bombe.
4 to 8 p.m.	N 72 W at 15 k	N 74 W at 15 k	N 77 W at 15 k	N 84 W at 15 k
8 to 10 p.m.	N 73 W „ 15 k	N 74 W „ 15 k	N 77 W „ 15 k	N 84 W „ 15 k
10 to Mid.	S 85 W „ 15 k	S 81 W „ 15 k	S 76 W „ 14 k	S 75 W „ 15 k
Mid. to 2 a.m.	N 85 W „ 15 k	N 87 W „ 15 k	N 86 W „ 15 k	N 85 W „ 15 k
2 to 4 a.m.	N 74 W „ 15 k	N 73 W „ 15 k	N 74 W „ 14 k	N 72 W „ 15 k
4 „ 5 „	N 60 W „ 15 k	N 53 W „ 15 k	N 53 W „ 15 k	N 41 W „ 15 k
5 to rendezvous	S 26 E „ 15 k	S 32 E „ 15 k	S 27 E „ 13 k	S 50 E „ 14 k

Of the remaining three scouts, the Kabyle and Orage were to steam at 16 knots towards Cape Sicié, examining Brusc harbour, then to proceed towards Aigues-Mortes and arrive at the cruisers rendezvous at 7 A.M. The Flibustier was to steer direct towards Bormes, at 20 knots, arriving there at 8 p.m. She was then to hug the coast, examine the anchorage of Hyères, and ascertain whether A Fleet had left Toulon. She was also to examine Marseilles, reach Aigues-Mortes at 3 A.M., and arrive at the rendezvous at 7 A.M.

The battle squadron C was to steer towards Toulon till 8 P.M., and manœuvre during the night at the Admiral's discretion. If the search for A proved ineffectual Admiral De Beauregard designed to meet his cruisers at a rendezvous in the Straits of Bonifacio, and thence to disperse them again in search of Fleet B. This alternative plan of scouting was not executed and need not be described.

Execution of the plans.

Such were the plans of the three Admirals, and before attempting to consider their strategy it will be more intelligible to explain briefly how the plans worked out. At noon on July 15th the C Fleet duly quitted Ajaccio, steering towards Toulon, and at 4 P.M. Admiral De Beauregard threw out his scouts as previously planned. At this moment the A Fleet was leaving Toulon and the B Fleet Algiers. Fleet A, at its full speed of 10 knots, passed between the Isles of Hyères and the mainland and continued to hug the coast on the pre-arranged course. Admiral De Maigret had ordered that no lights should be displayed. The night was fine and dark, and on reaching Cape Martin, at 3 A.M. on 16th, the Admiral, having seen nothing of the enemy's scouts, believed that his plan had so far succeeded. As the distance to be covered by the Fleet B was the greater, Admiral De Maigret now reduced his speed to 7 knots and steered east towards the limit of the manœuvring ground. The indicated route was followed at slow speed till 7 P.M. on 16th, when, at the approach of night, and when off the coast of Corsica, the squadron increased its speed and arrived abreast of the Sanguinaires Light at 2 A.M. on the 17th. So far Admiral De Maigret had seen nothing of the enemy, but at 3 A.M. signals were observed to the

westward, and at daylight the A Fleet found itself in sight of the battle squadron of C and three of its cruisers. At this point it seemed highly probably that A would be overtaken before the appearance of B, and an exciting chase began. At 7 A.M. the Léger, one of B's scouts, joined Fleet A in spite of an attempt by C's cruisers to cut her off, and at 7.20 the B Fleet—which had been timed to reach the rendezvous at 9.30 A.M.—fortunately for A hove in sight, and thus changed the whole situation. Admiral De Beauregard, seeing that no action could be fought before the junction of the allies, had now to retreat to Ajaccio, and consequently failed in his operations. Fleets A and B united at a point considerably to the northward of the specified rendezvous, thanks to the early arrival of B. The allies ineffectually pursued Fleet C till it neared its base.

The movements of Fleet B need no explanation. It followed the prescribed route, but was fortunately in advance of its time. The detached scouts of A captured the cruiser Milan and duly united at position 530 with the detached scouts of B. This united squadron of scouts cruised for a day and a night without encountering the enemy, and ultimately rejoined without having been of any practical assistance to the allies.

Admiral De Beauregard's failure to avert the junction of A and B has still to be explained. The scouts of C were duly thrown out at 4 P.M. on 15th, and until 8 P.M. the battle squadron steered towards Toulon. The scout Flibustier, steering direct upon Bormes, approached the track of the A Fleet at 9 P.M., and sighted the squadron. The lieutenant in command of the Flibustier was young and inexperienced. For some time he followed Fleet A to make sure of its identity and course, and was not himself observed. The Flibustier then steered to the westward at full speed, signalling the discovery of Fleet A, and the signal was seen by some of the C scouts. The lieutenant also communicated with his admiral, and informed him that the Fleet A had taken an easterly route. Admiral De Beauregard immediately altered course in pursuit, the Flibustier being ordered to guide the squadron. The cruisers within signal distance were ordered to re-join. At this point the cruiser Cécille broke down and returned to port. The lieutenant of the Flibustier proved unequal to the responsibility of guiding his squadron. He appears to have become confused, and the course he steered unfortunately brought him into contact with the Umpire's ship Richelieu. The umpire ordered the Flibustier to stop and communicate, and this caused considerable delay, but, instead of afterwards resuming his course and guiding the C Fleet, the lieutenant seems to have argued that the presence of the Richelieu indicated the proximity of

Why C fleet failed.

Fleet A. On his own responsibility he decided to remain stationary, and await the approach of the enemy. He made no more signals to his own Fleet. During this time, and in consequence of the lack of signals to guide them, the scouts of C Fleet had scattered in all directions. The Milan returned to Ajaccio; the Suchet scouted unsuccessfully to the N.E., and only by chance rejoined her fleet on the night of the 16th; the Vautour broke down and returned to port; the Bombe and Forbin lost themselves. The D'Iberville was the only scout which remained in company with the C Fleet. Thus the whole squadron was thrown into confusion through the Flibustier's mistake, and the A Fleet was allowed to escape. Without cruisers to help him, Admiral De Beauregard had to abandon the alternative plan of scouting for Fleet B, and it appears to have been largely a matter of chance that he fell in with the enemy on the morning of the 17th. Thus the failure of Admiral De Beauregard's strategy was chiefly due to the mistake of the Flibustier and the general confusion among the cruisers. It may be questioned, however, whether the admiral was fully justified in trusting his squadron to the guidance of a junior officer.

Strategy of Admiral De Beauregard.

It is generally admitted that Admiral De Beauregard's tactics were good, and his strategy sound. He was clearly right in steering towards Toulon, and in concentrating his attention upon Fleet A on the night of the 15th. Had he been better served by his scouts the A Fleet would probably have been cut off, and brought to action on the 16th. The course assigned to the Flibustier brought her within sight of Fleet A at 9 P.M., which indicates that Admiral De Beauregard considered it possible that the A Fleet might take an easterly route from Toulon; but the excellent disposition of his scouts generally shows that Admiral De Beauregard intended to search an extensive area, and left nothing to chance. No plan of scouting could, perhaps, have been better adapted for the discovery of Fleet A, and the cause of the failure is obvious. It is evident that if Fleet A had steered in a south-westerly direction, with a view of effecting the junction at some point to the north of Majorca, its course should equally have been detected by C's scouts; but it is less certain that in this event Admiral De Beauregard could have succeeded in catching Fleet A before the junction would have been effected. Much would have depended upon the position of the C battle squadron at the moment when the course of A was discovered and communicated to Admiral De Beauregard by his scouts. Here it is necessary to consider whether A and B Fleets could reasonably have hoped to have effected their junction by a more direct route than that chosen.

Strategy of the allies.

We have seen that Admiral De Maigret determined upon a rendezvous at position 381, with an alternative rendezvous at position 319, in the event of his first route being detected. The strategy of the allies is open to the obvious objection that both A and B Fleets had to traverse very circuitous routes under the plans adopted. Leaving their ports at 4 P.M. on July 15th, the allies did not expect to reach the first rendezvous before 9 A.M. on the 17th, and this delay exposed them to the chances of being cut off and defeated in detail. The alternative route, culminating in a junction at position 319, was still more circuitous, as the junction would have been delayed until 8 P.M., or even midnight, on the 18th. There is a fair presumption that if the position of the A Fleet had been discovered on the 16th, Admiral De Maigret would not have been able to avoid an action with the enemy. Practically this action would have been fought but for the disorganisation of C's scouts on the night of the 15th, as it was only the want of scouts that prevented Admiral De Beauregard from following up his advantage. Thus it may be doubted whether the alternative route could possibly have been followed by Fleet A. The fate of the allies practically hinged upon A Fleet's success in evading the enemy's scouts on the first night, and, as we have seen, the fleet was promptly discovered. On the other hand it may be argued that a junction of the allies in the Straits of Bonifacio—close to the enemy's port—was not very likely to be anticipated by that enemy, or, in other words, that the easterly route was calculated to puzzle Admiral De Beauregard. There is some weight in this contention, but the tactics adopted by Admiral De Beauregard ought to have resulted in the destruction of Fleet A. An examination of the chart will show that a more direct junction, though not free from risks, would at least have been possible. In war no operation of importance is free from risks; the brilliant commander is he who avoids unnecessary dangers and carefully weighs all probabilities. In view of the great objections to the circuitous routes adopted, the critics were generally of opinion that the allies should have attempted to reach a rendezvous to the westward. If, for example, the rendezvous had been fixed at the point marked on the diagram as R′, there is a fair presumption that Fleet C would have failed to prevent the junction, and that the junction might have been effected in twenty-two hours. The point in question could not have been reached by Fleet C in less than twenty-two hours, even if Admiral De Beauregard had steamed direct from Ajaccio towards it. This assumption is improbable, because the admiral could not have accurately guessed the position of the proposed junction, and would have lost some time in an endeavour

to discover the course of Fleet A by the aid of his scouts. On the other hand it must be admitted that even had the Fleets A and B steamed direct for the point R′, Fleet A might possibly have been cut off before she reached it. It is unnecessary to insist dogmatically upon the point R′; any rendezvous nearly equidistant from Algiers and Toulon, and to the westward of Minorca would have been strategetically preferable to the eastern rendezvous chosen by the allies.

The Blockade of Ajaccio.

The French manœuvres in the Mediterranean concluded with the blockade of the C Fleet in Ajaccio by the allied Fleets A and B. The objective of C Fleet was to break the blockade and reach the coast of Provence, and in this attempt Admiral De Beauregard was entitled to make use of the *défenses mobiles* of Corsica and Toulon. Under the rules laid down for the conduct of the blockade the ships of A and B were permitted to approach within four miles by day, and three miles by night of a line joining the following points on the Corsican coast: Point Revellata, Cape Gargalo, Cape Rosso, Sanguinaires Lt, Cape Muro, and Point Senetose. C could force the blockade between Point Revellata and Point Senetose. The zone of action for the *défenses mobiles* of Corsica extended between these two last named points and up to thirty miles from the coast. The zone of action for the Toulon *défenses mobiles* extended between the meridians of Planier and Cape Ferrat up to thirty miles from the French coast. Fleet C was entitled to make use of all signal stations on the Corsican coast, and of those on the coast of Provence between Marseilles and Villefranche. The speed of C Fleet was limited to 10 knots, whilst the allied battleships were allowed a speed of 11 knots. The cruisers on both sides were allowed the same speeds as in the previous manœuvres.

It will be seen from these conditions that the blockading force under Admiral De Maigret was liable to be harassed by the *défenses mobiles* of both Corsica and Toulon. The composition of the squadrons was precisely the same as in the previous operations so that Admiral De Maigret's battleships were not well guarded by torpedo-boat catchers. He was only provided with three of these vessels and with three *torpilleurs*. He had also six cruisers. The blockaded fleet had five cruisers, two torpedo gunboats, and four *torpilleurs*, and was thus better provided with scouts than the allies. The conditions would thus appear to have been somewhat in favour of Fleet C, but on the other hand the allies, if successful in

resisting torpedo-boat attacks, had only to keep a careful watch upon the Corsican coast to prevent the escape of Fleet C, and could hope to overtake it by the aid of superior speed. The operations were scarcely carried out in a manner calculated to throw fresh light upon the interesting problem of blockade under modern conditions.

Escape of Fleet C.

The plan of the allied admirals was as follows: The battleships were to act independently of the cruisers and torpedo craft, and were to keep watch upon a considerable section of the coast, while the scouts were to follow every movement of the scouts and *torpilleurs* of Fleet C. Had this plan been thoroughly carried out the blockade might possibly have proved effectual, but it will be seen that Fleet C escaped by means of a simple *ruse de guerre.* The blockade was established at 4 P.M. on 23rd July. The night proved dark, and suitable to the plans of Admiral De Beauregard. His whole force of cruisers and *torpilleurs* protected by the *défenses mobiles* of Corsica, proceeded within two miles of the coast to some distance north of Ajaccio. Here the vessels all displayed their search-lights to seaward, forming a blinding screen which obscured the view of the blockaders. This was simply a ruse, but it succeeded admirably. Admiral De Maigret assumed that the C Fleet was escaping to the north of Ajaccio, under cover of this glare of electric light thrown seawards. The allied battleships consequently steamed to the northward, leaving only the cruiser Davout off Ajaccio. Prepared for this movement, Admiral De Beauregard immediately put to sea with his battleships and made good his escape. The escape is said to have been noted by the Davout, but her captain took no action whatsoever. He neither gave chase nor communicated with Admiral De Maigret. From this it may surely be inferred that the Davout did not in reality observe the departure of C's battleships. Yet few things appear to be impossible in connection with French naval manœuvres, and *La Marine Française* asserts positively that the Davout witnessed the breaking of the blockade and did nothing. The cruisers of Fleet C kept up their illuminations all night, and by the morning of the 24th the Fleet C battleships were far beyond reach of pursuit. Curiously enough, Admiral De Maigret had, for some time, no suspicion of the breaking of the blockade, and throughout the 24th July the allies continued to watch Ajaccio. Doubt crossed the mind of Admiral De Maigret on the evening of the 24th, and he sent in a scout to ask for information from the enemy. He also endeavoured to obtain information from the enemy's signal stations, but none was accorded to him. The blockade was continued, but on the night of the 24th the cruisers and *torpilleurs* of C Fleet evaded the scouts of the allies and made good their escape to the northward of Ajaccio. A cruiser saw

them, chased them, and signalled their escape; but no notice was taken of her signals, as the allies were still watching for C's battleships. At dawn, on the 25th, the allied admirals learnt the truth. They had been completely foiled. It may be added that the *défenses mobiles* of Corsica proved of little assistance to Fleet C. Four torpedo-boats were captured by the allies while the crews were enjoying their breakfasts, but two others claimed to have torpedoed the Magenta of Fleet B. These operations can scarcely be said to have produced valuable results, and I shall merely venture to quote the following from *La Marine Française*:—"Even more clearly than previous operations, the manœuvres of 1895 show the weakness of our naval organisation. They strikingly confirm all the severe criticisms to which our Navy has been subjected for several years past. It would be unfair to say that the evils have increased. Far from this, we are amongst the first to admit that latterly progress has been made, for, in spite of all obstacles, new ideas have gained ground."

Scouting Tactics compared. It is interesting to note that the operations carried out by the British and French squadrons alike involved the intelligent use of scouts in a more than usually large degree, thus showing the increasing importance of fast cruisers to modern battle fleets. In a sense this is no new lesson, as we know that Lord Nelson himself deplored the lack of frigates; but the annual manœuvres have at least tended to enforce the importance of steam scouts. The operations of 1895 make it additionally clear that admirals will have to depend largely upon the efficiency of scouting tactics under the most varied circumstances. Whether it is possible to compare the scouting tactics of the British and French admirals in the widely-differing operations I have described, may, perhaps, be questioned. I think, however, it may be of interest to consider whether the scouting tactics of Lord Walter Kerr might not have been employed by Admiral de Beauregard with even better effect than the dispositions adopted by the latter in his search for the Toulon fleet. To judge of this it is merely necessary to project eleven courses radiating from the point at which Admiral de Beauregard actually threw out his scouts. On Lord Walter Kerr's system these courses would probably have radiated between due N. and S.W. by W., and would thus have covered fully as much ground in the vicinity of Toulon as would have been essential for the prompt discovery of the A Fleet. The three scouts steering N., N. by W., and N.N.W., would have crossed the track of the Toulon Fleet, or have had an excellent prospect of discovering its route. These three, and also the next scout steering N.W. by N., would have had only short distances to cover, and might have rejoined

the battle squadron much more rapidly than under the plan adopted. The remaining seven scouts, steering between N.W. and S.W. by W., might have examined an extensive area without twisting and turning as they were required to do under the French Admiral's plan. On the other hand, the French scouts were kept closer together throughout the night under Admiral de Beauregard's plan than they could have been under the plan of Lord Walter Kerr. The conditions, it must be remembered, were absolutely different, and it is necessary to consider that while the British squadrons were friendly and in search of one another, the French were hostile and were trying to outmanœuvre each other. Yet, on the whole, it will be evident that Lord Walter Kerr's plan of scouting might have been employed by Admiral de Beauregard with good results. The weak points of the French Admiral's plan were that his cruisers were assigned courses somewhat too close together—thus restricting the area of search—and that the point of rendezvous for the scouts was ill-chosen. Reuniting after fifteen hours, the French scouts could scarcely have rejoined Admiral de Beauregard in less than twenty-five hours. Thus, supposing the search for the Toulon Fleet to have failed, the search for the Algerian Fleet might have been very seriously delayed. From all this it would appear that the ideal scouting disposition is that which covers the largest possible area in the minimum of time, and which promptly reunites the battle fleet with her scouts.

CHARLES GLEIG.

CHAPTER XIII.

Manning.

In the chapter dealing with the progress of the British Navy during the past year it was pointed out that, though we might rest satisfied that we possessed in the country the resources for supplying all the material for a naval warfare, we must regard with considerable apprehension the state of our resources for manning the ships which we can build so readily. A calculation was made in the *Naval Annual* of last year that 97,700 men would be required to man every ship then built or building. During the past year we have laid down four first-class cruisers, which will absorb 3000 men; four second-class cruisers, about 1800 men; two third-class cruisers, about 400 men; and twenty torpedo-boat destroyers, about 1000 men —or a total of 6200 men. Included in the shipbuilding programme of 1896–7 are five battleships, which will require 3500 men; four first-class cruisers, 3000 men; three second-class cruisers, 1350 men; six third-class cruisers, 1200 men; twenty-eight destroyers, 1400 men—or a total of 10,450 men. On the other hand, our requirements will probably be diminished before these vessels are completed to the extent of over 7000 men by the elimination of several of the older ships now classed as armoured cruisers or third-class battleships, of certain coast defence ships and of unprotected cruisers, such as the Inconstant, Active, and the Gem class. There remains a net increase of some 9,000 men in our prospective requirements about four years hence. That we have ample men for our present peace requirements is shown by the fact that we have very largely increased the number of ships in commission without interrupting the courses of instruction. Owing to the addition of two battleships to the Channel Squadron, the commissioning of the Flying Squadron and the flotillas of torpedo-boat destroyers, besides additions to our squadron on the China Station, we have upwards of 5000 more men afloat at the present time than we had last year. We have seen already, and we shall see still more in the near future, the effect of the large entries of boys in recent years by a considerable increase in the numbers available for sea service. Any

Increase of Navy.

increase that there may be on this account could hardly, however, be sufficient to balance the increase in our prospective war requirements—in other words, our position as regards the supply of men for the Navy in time of war has certainly not improved since last year.

Numbers Required.

We shall require in two years' time over 100,000 men, and in four years time upwards of 105,000 men, to man the Navy at the outbreak of war. We have now 85,800 men available in the ranks of the Navy,* no allowance being made for sickness and casualties, and we have 25,000 men not adequately trained in the Naval Reserve. It is doubtful whether we could put every available ship, though it is quite possible that we could put every effective ship, into commission at once, by withdrawing from commission a considerable number of the sloops and gunboats which figure so largely in the "Navy List" and which are of such little use for war purposes. To man every available ship would require at least two-thirds of the Royal Naval Reserve, in addition to the permanent force of the Navy. This being the case, there is little if any margin to make good "the wastage of war," whether by losses in action or any other cause, and the great demand for men will not arise for the purpose of making good the wastage of war. That demand will be mainly due to the fact that we possess in this country resources for the supply of ships and war *matériel* beyond comparison superior to those of any other country.

Resources for Shipbuilding.

It may be estimated from the details given by Commander Robinson in an article in the *Naval Annual* of 1894, that our shipbuilding establishments, other than Government dockyards, are capable under ordinary circumstances of undertaking the construction of at least twenty battleships and more than twice this number of cruisers at the same time. In a period of national emergency this output, especially in the cruiser classes, could be very materially increased. It would not be extravagant to estimate that our shipyards are equal to the construction of twenty-five battleships and seventy-five cruisers, besides smaller craft, torpedo-boat destroyers, etc., at once. A very considerable proportion of the cruisers could be completed in less than one year. At least half the battleships and the remainder of the cruisers could be completed within two years. The smaller craft could be completed, of course, within a few months. It is useless for a country to possess such unparalleled resources for creating the *matériel* for naval warfare unless it, at the same time, possesses the resources for the supply of the *personnel* which is to use that *matériel* when it has been created. Therein lies the weak point in the armour of our national defence at the present moment,

* Exclusive of some 1300 Pensioners.

and it is to this point above all others that it is necessary we should devote our attention.

Numbers in war and peace.

If this country were plunged into war to-morrow with a first-class naval power, or a combination of naval powers, there would be an immense demand for ships and men. The ships can be had by paying for them. The men are not to be had, unless provided for beforehand. It is impossible to estimate accurately what number of men would be required in a naval war. It may be put at least 50,000, and possibly at 100,000, beyond the numbers at present available. The experience of the past hundred and fifty years, at any rate, shows that the number of men required in peace time in the Navy is no criterion whatever of the number required in time of war. The difference between the numbers maintained in the ranks of the Navy in peace time and the numbers enrolled in time of war has been extraordinary in the past, and may serve as some guide as to the future. The number of seamen and marines voted for the Navy at various periods since 1750 are given below:—

Years.		Seamen.	Marines.
1750–55	Peace	8,000 — 12,000	None
1756–62	War	40,000 — 51,000	9,000 — 19,000
1764–75	Peace	11,000 — 14,000	4,000 — 5,000
1783	War	84,700	25,300
1784–92	Peace	11,500 — 14,000	4,000 — 4,400
1793	War	40,000	5,000
1811–13	War	113,000	31,000
1815	War	70,000	20,000
1824–52	Peace	20,000 — 32,000	9,000 — 11,000
1856	War	60,000	16,000

In the three great wars in which we were engaged during the latter half of the last century we required from four times to eight times the number of men for the Navy that we had had in the intervening years of peace. In the last European war in which we took part we required double the number of men for the Navy that we had in the previous years of peace; and this although we were fighting in conjunction with an ally which was powerful at sea and against an enemy whose sea-power was relatively insignificant.

Policy to be pursued.

For supplying the number of men in time of war two courses are open. We can either maintain in peace time the *personnel* of the Navy on what is practically a war footing, or we must have a reserve adequate in numbers and efficient as regards training to bring the numbers up from a peace to a war strength. Of late years the naval policy of the country has been apparently directed to attain the first object, or in other words, to make the Navy less and less

dependent for war purposes on a reserve. Exception may be taken in some quarters to this statement. It is, therefore, well to point out that the total numbers voted for the Navy were—

In	
1888–89	62,400
1889–90	65,400
1890–91	68,800
1891–92	71,000
1892–93	74,100
1893–94	76,700
1894–95	83,400
1895–96	88,850
1896–97	93,750

During the past nine years there has been an increase of over 31,000 in the total numbers voted for the Navy. During the past five years there has been an increase of nearly 19,000 in the numbers available for sea service. In the year 1888 there were 19,051 officers and men in the Royal Naval Reserve, and in 1895 the average number of all ranks borne was 24,792.

Naval Reserves. The compilers of the *Naval Annual* have always objected to the policy which is apparently at present being pursued by the country. "No country," Lord Brassey said in the House of Lords last year in the discussion which he initiated on this important subject, "has ever maintained afloat in peace the number required in actual war. The reason is obvious. Such a policy would involve an enormous expenditure, not only on pay, provisions, and pensions but in the maintenance of ships to give the practice at sea which is essential. If men remain too long in harbour they lose their sea habits." In commenting on these remarks the *Times* observed: "This is a consideration of the utmost moment, and some good authorities think that it has already been too much lost sight of by the Admiralty."

Cost of permanent Force and Reserve. The main argument in favour of depending largely on Naval Reserve is undoubtedly the question of cost. In this connection it may be interesting to note the growth in cost of the *personnel* of the Navy. For the twenty years from 1866–7 to 1886–7 Vote 1 (wages of seamen and marines) was fairly stationary, ranging from £2,600,000 to slightly over £3,000,000. The non-effective votes gradually increased—Half-pay from £702,000 to £801,000; pensions and allowances from £529,000 to £907,000. Vote 2 (victuals and clothing) also remained fairly stationary, £1,235,000 at the beginning, £1,278,000 at the end of the period. In 1890 the gross estimate for Vote 1 was £3,440,023; for Vote 2, £1,388,186; for half pay, £796,855; for pensions, £938,476. The Coast Guard was provided for in Vote 1 instead of in Vote 7 (Royal Naval Reserves), which amounted to £152,100.

In 1896 the gross estimates are :—

Vote 1	£4,536,100
„ 2	1,800,544
„ 13 (Half Pay).	761,258
„ 14 (Pensions)	1,052,090
	£8,149,992

For the above expenditure we are to have 85,818 officers, seamen, marines, and boys (including the Coast Guard) available for sea service. For an expenditure of £223,387 on the Royal Naval Reserve we are to have 1600 officers and 24,200 men, or a total of 25,800.

Deducting boys in the former and making a very liberal reduction for non-effectives in the latter, we get a rough idea of the respective costs to the country of the permanent force of the Navy and the Royal Naval Reserve, including officers in both cases. It amounts to £100 a-head in the former and £10 a-head in the latter. No estimate is made for the cost of ships put into commission and kept in commission in order to prevent our bluejackets deteriorating ashore; nor is the heavy cost of naval barracks taken into consideration. The annual charge under these two headings alone would be sufficient to largely increase the strength of the Naval Reserve.

Objections to depending on Reserve.

Various objections have been raised to the policy of depending largely on a Naval Reserve. The first, one which carries and which ought to carry great weight with naval officers, is that the modern warship is such a mass of complicated machinery that a high degree of technical knowledge is needed by the crews, and this cannot be obtained without a prolonged training on board a man-of-war. As regards this first objection, it is no doubt true that in the old days but little training was required to make a seaman of the mercantile marine into an efficient bluejacket, but there is probably equal truth in the following observations of a writer in the *St. James's Gazette*: "It is not, we believe, in the least degree necessary that the bulk of men to be added to the Navy on an outbreak of war should be elaborately trained. Provided that they are taken from such classes as are accustomed to the sea, and to the kind of machines used in ships, an amount of preliminary drill small in proportion to what has been received by the regular staff will do. Our establishment is enough to supply not merely a skeleton of highly-trained men, but the large majority of the crews which would be needed at the outbreak of war. The complements could quite well be filled up by much less practised hands, provided that they were of promising material to begin with, and that they had been taught the mere alphabet of the sea-trade." There are many stations

on board a man-of-war where high technical skill is not required; and it is probable that as many personal qualities were required of the gun's crew of the 18-pounder in the days of Nelson as there are of the crew of a 6-in. or a 6-pounder Q.F. gun to-day. It must certainly be easier for an untrained man to make good shooting with the beautiful weapons which we have at present than with the inaccurate guns of old days. The objection that a large proportion of the Naval Reserve would be in distant parts of the world and therefore unavailable on the outbreak of war, has but little foundation in fact. In the valuable paper which Commander Coborne, R.N.R., read last year before the United Service Institution, he showed that over three-fourths of the seamen class R.N.R. were actually employed in Home Trade, or at home, and therefore immediately available for the Navy. Our estimate of last year—that two-thirds only would be reckoned upon at short notice—was considerably under the mark. The unfavourable reports which frequently appear in the public press as regards the slovenly appearance and want of smartness of the Naval Reserve men embarked for the Manœuvres is an objection hardly worth noticing. It is quite certain that this objection would rapidly disappear in the event of Reserve men being called out for permanent service in the Navy.

Having come to the conclusion that the true policy of the country is to depend largely on a reserve for bringing the Navy from a peace footing up to a war strength, and for making good the wastage of war, we are met at once by difficulties as to the source of supply for the reserve. It is quite possible that the second class Naval Reserve could be very considerably increased from our fishing population, but in the Mercantile Marine, which ought to be the chief source of the supply for the Naval Reserves, British seamen are becoming fewer. In 1889 it was estimated that of 79,280 petty officers and seamen in the Mercantile Marine there were 60,700 British and 18,580 foreigners, and of 27,510 stokers, 3510 were foreigners. Three estimates have recently been given of the number of British seamen at present employed. Mr. Williamson, of Liverpool, estimated rather more than a year ago that out of a total of 235,000 hands employed, including engineers, firemen, stewards, etc., not more than 55,000 were British seamen. The evidence of Mr. Howell, the principal clerk in the Marine Department of the Board of Trade, was quoted by Sir Charles Dilke on the introduction of the Navy Estimates in the House of Commons. He said that there were now 63,000 able seamen in the British merchant navy, and of these 7000 were Lascars and 9000 were fishermen or yachtsmen; of the remainder 13,000 were foreigners. From a report submitted to

Sources of supply for Reserve.

Parliament it appeared that the number of foreigners in the British ships in 1885 was 14 per cent., whereas by the calculation of Mr. Howell the number in 1893 was 36·3 per cent., or an increase of 22·3 per cent. in eight years.

Diminution of British seamen.

The cause of the gradual diminution of British seamen in British vessels is not far to seek. There is no good ground for supposing that as a people we are losing our taste for the sea. The immense and rapidly increasing flotillas of yachts of all sizes round our coasts are a proof that the contrary is the case. The real cause is that the wages offered by the shipowner, together with the drawbacks attendant on a sea life, are insufficient to attract men of British birth. The merchant seamen, and even the fishermen, earn miserable wages compared with the wages of any skilled workers ashore. While the wages of the latter have advanced in actual amount and in purchasing power, the wages of the merchant seaman have not advanced proportionately. The want of certainty of employment, the dog's life that so many men have to lead while waiting for a ship in foreign or even English ports, is a most serious objection to the merchant service as a career. Whatever may be the cause, the gradual substitution of the foreigner for the Englishman in our merchant service is a matter of supreme national importance. "It is doubtful whether in the long run a great fleet can be maintained without a great and contented seafaring population behind it." These words, which were used in the *Manchester Guardian* a few weeks ago, express the gravity of the present situation.

How can reserve be created.

This being the state of things with which we have to deal, how are we to create a reserve for the navy adequate in numbers and efficiently trained? The Inscription Maritime of France has been well described in a previous chapter by M. Weyl, who estimates that omitting all non-effectives it could furnish only 40,000 out of a nominal 100,000 men in case of war. The Inscrits Maritimes have a monopoly of the seaman's and fisherman's profession; they are looked after by the State their whole life; are educated as children, and are pensioned in old age. The institution of any form of naval conscription may be dismissed as out of the question in England, but the close connection between the Navy and the Inscription Maritime which exists in France might well be imitated in many respects in this country.

Short service.

For the creation of a Reserve two alternatives are open, each of which is capable of modification in detail, and which bear some resemblance to one another. It has been proposed that a reserve should be created by passing men rapidly through the navy and by using the navy to some extent as a training ground for the merchant

service. If this plan were adopted it would be open, as was pointed out by Lord Spencer in the debate in the House of Lords already referred to, and in a leading article in the *Times*, to the following objections. First—two classes of the permanent force would have to be established, one of which is engaged for twelve years and the other for five or three years, or whatever the period fixed upon may be, while men from both would be indiscriminately employed in the same ships. The second objection is a corollary of the first. The fact that two classes of the permanent force engaged for different periods were serving indiscriminately in the same ships would be found so inconvenient that it would lead almost inevitably to a reconsideration and shortening of the longer period of service. These objections may be serious, but they are not vital. A more important objection to the system of training men for the merchant service in the navy is that men who have served their earlier years at sea in the navy would take very unkindly to the merchant service. The main objection, however, to the institution of a short service system for the British Navy generally is its great costliness in proportion to the results attained. If the period of service in the navy was three years, the period in training-ships would be probably reduced to one year, but one third of the short-service men would be under training and unavailable for service in the fleet.

The alternative is to utilise to their full extent the resources at present available in the fishing population, not only of the mother country, but of the colonies (more especially Canada and Newfoundland), and to take steps to render our mercantile marine what it once was, a valuable support to the navy in time of war. **Development of existing resources.**

We have at present upwards of 23,000 * men in the Naval Reserve, about 1,500 of whom are stokers, and the remainder divided about equally between the first and second class. The first-class naval reserve is recruited mainly from the mercantile marine, and receives a retaining fee of £6. The second-class reserve is recruited mainly from the fishing population, and is paid a retaining of only £3 5*s*. Some of those who are best qualified to judge—viz., naval officers who have had the opportunity of seeing the Naval Reserve at drill—believe that the second-class reserve man is fully as valuable a recruit for the naval service, and is frequently more efficient than the man of the first-class reserve. On the other hand, we may gather that certain classes of fishermen in the islands of Scotland are not desirable recruits for the Naval Reserve. When the Shannon was sent to the Hebrides the men refused to embark for their month's drill or to drill anywhere else than in the battery **Our present Reserve.**

* Excluding officers.

ashore. Such men should immediately be dismissed from the Reserve. The occurrence points strongly to the necessity of insisting that all classes of the reserve should be embarked from time to time for their drills, and if possible in the manœuvres.

Reorganisation of Reserve.

If the second-class reserve men are as efficient as the first-class, there seems no ground for maintaining the present distinction between the first and second-class reserve. Two classes should still be maintained; but the distinction between the two should not depend on the sources from which they are recruited, but on efficiency. No man should be eligible for the first-class reserve until he had done a period of training in the Navy—whether it be for six months or for a year. The State-aided apprentices, to which we refer below, would, probably, be entered direct in the first-class Naval Reserve after their year of training in the Navy. Fishermen and others who had entered in the second-class reserve would be promoted to the first class on their satisfying the above condition of promotion. That such promotion was open to them would be a most valuable stimulus to them to join the reserve in the first place, and to the efficiency of the second-class reserve in the second place.

State-aided apprentices.

In view of the facts already pointed out, it is certain that the merchant service cannot be rendered a valuable recruiting ground for the Naval Reserve without the assistance of the State.* It is hardly possible to contemplate a re-enactment of the Navigation Laws as a remedy for the state of the manning of the mercantile marine. The State will have to offer inducements to ship-owners to train men for the Naval Reserve and to man their ships with Naval Reserve men when trained. Some years ago Lord Brassey proposed, in his book on "Merchant Seamen," that ship-owners should be encouraged to enter apprentices under an engagement at the end of their four years' apprenticeship to do a year's training in the Navy. The sum to be paid to the ship-owner was £20; the sum to be paid to the apprentice was £15; £10 of which would only be paid on his joining the Navy for his year of service. On the conclusion of his year in the Navy, at the age of 20, the apprentice would become a valuable Naval Reserve man. These men could be kept efficient by doing a month's drill annually, as the Naval Reserve do at present, and by being occasionally—say once in

* "The Associated Chamber of Commerce at its recent meeting re-affirmed its opinion that her Majesty's Government should take action to secure an increased supply of well-trained British seamen, as by so doing they would enlarge the resources from which the Royal Navy might draw its reserves, an increase which is absolutely essential to preserve the command of the sea, for the protection of our commerce and the food supply of the nation, in addition to insuring the naval supremacy of the British Empire."

five years—embarked for the manœuvres. It is easy to insist on steamers in receipt of mail subsidies carrying Naval Reserve men, but the idea of subsidising ship-owners generally for manning their ships with Naval Reserve men instead of foreign seamen is open to many objections, and would demand the most careful consideration.

In view, however, of the present condition of the manning of our mercantile marine, which constitutes a grave national danger in case of war, it would be worth our while to do so. An increased retaining fee might have to be offered to induce men to enter the Naval Reserve in sufficient numbers by these means, but the fact that a young man would have £6 besides his pay at the age of 20 or 21 would be probably a sufficient inducement. Though the cost of our Naval Reserve per man should be considerably increased, though the cost should be even doubled by the system proposed, we should still get from three to five efficient Naval Reserve men for the cost of one blue-jacket. It is not supposed that the plan set forth above contains more than the general principles on which we should proceed, and it may be modified in many respects while maintaining those principles. From the mercantile marine we might get 5,000 more desirable recruits at the present moment, but it would only be by degrees and by some such plan as we have sketched, that the *personnel* of the mercantile marine can be made to supply a substantial reserve for the navy. It does not seem unreasonable to expect that in time we might have from 25,000 to 30,000 naval reserve men, whether seamen or stokers, serving in British merchant ships.

Fishing population. The fishing population of the country is the best available source for immediately increasing the numbers of the Naval Reserve, and there is every reason for believing that with the stimulus of promotion from the first to the second class we could get an additional 10,000 men from this class, which in course of time might become 20,000 or more.

Colonies. The fishing and seafaring population of Canada and Australasia has not yet been tapped as a source of supply for the Naval Reserve. If the Colonial Governments were invited to contribute to the maritime defence of the Empire by assisting to establish branches of the Naval Reserve in the Colonies, it can hardly be doubted that they would give a ready response to the invitation. A Naval Reserve drill ship should be stationed at St. John's, another at Quebec or Montreal, and another in the Australian Colonies. Provision could be made that a proportion of the crews of the seagoing ships on these stations should consist of Colonial Naval Reserve men going through their period of training in the Navy. We should be justified in anticipating a supply of 5,000 men for the

Naval Reserve from Colonial sources in the near future, which might in course of time be raised to 10,000 or even 15,000 men.

Taking all these sources of supply into consideration, the Naval Reserve could in ten years' time be raised to a total of 75,000 men.

Principles of recommendations.

The principles which have guided the writer in framing the suggestions contained in this chapter may be thus summed up.

1. It is a gross waste of national resources to maintain in the navy in peace time the number of men required for war.

2. The permanent force must be of sufficient strength to man all available ships to the extent of three-fourths of the crew on the outbreak of war.

3. A Naval Reserve may be depended upon for supplying the remaining fourth of the crews and for supplying the requirements of war.

Conclusions.

The conclusions to which we are brought if we accept these principles are—

1. There should be no further increase of the permanent force. We have already sufficient men to man all available ships to the extent of three-fourths of their crews.

2. As the Naval Reserve increases in numbers and becomes more efficient, a slight reduction in the permanent force may be possible.

3. If our requirements for manning the Navy at the outbreak of war are 100,000 men, 80,000 * men available for sea service in the permanent force and 75,000 men in the Reserve are the numbers that ought to be maintained.

4. The Naval Reserve must be organised on a different system to that now in existence and must be better trained.

Officers.

If the problem of supplying men for the Navy had been as thoroughly grappled with as the problem of supplying officers, this chapter would never have been written. An increase in the numbers of each rank below that of flag officer on the executive list has been sanctioned, in accordance with the report of Sir Anthony Hoskins' Committee. The number of officers in the Naval Reserve has been raised to 1300, and will shortly be raised to 1500. Very important changes in the conditions of promotion and retirement have been made, which will tend to greatly increase the efficiency of the force. These changes are fully described in the First Lord's Memorandum and need not be repeated here. It is satisfactory to know that there is no lack of suitable candidates for the Reserve.

T. A. Brassey.

* Leaving a margin for sickness and casualties.

PART II.

BRITISH AND FOREIGN
ARMOURED AND UNARMOURED SHIPS.

PART II.

ALPHABETICAL LIST OF BRITISH AND FOREIGN ARMOURED AND UNARMOURED SHIPS.

The lists of ships have been subjected to important modifications. The order of the columns has been rearranged so as to correspond in the British and Foreign Lists. A fresh column has been introduced for complements in place of the column for coal endurance, which could never be satisfactory. A column giving the place where a ship is built has been introduced in the foreign lists, and the calibre of all foreign guns is now given in inches.

As every nation is constantly rearranging the armament of individual ships it is only possible to publish the latest accessible information.

The vessels commonly known as Torpedo Catchers, which in the British Official *Navy Lists* are called First Class Gunboats, and in the French Lists are known as Aviso Torpilleurs, are called in these lists Torpedo Gunboats. Torpedo-boats of all classes below Torpedo Gunboats are placed in a separate list.

Storeships, Special or Harbour Service Ships, and Training Ships are not included in these lists.

The ships of those Powers whose navies are of small importance will be found at the end of Part II.

The sketches of the ships are all drawn on the same scale (except in a few cases specially indicated), so that their relative sizes are apparent by inspection.

ABBREVIATIONS.

The following abbreviations are used throughout the Alphabetical List, occurring mainly in the first column, showing the class of ship and in the armour column:—

a.c.	Armoured cruiser.
a.g.b.	Armoured gunboat.
b.	Barbette ship.
br.	Broadside ship.
c.b.	Central-battery ship.
c.d.s.	Coast-defence ship.
c.	Composite-built hull.
comp. (in armour column).	Compound or steel-faced armour.
c.t.	Conning-tower.
shd.	Sheathed.
corv.	Corvette.
cr.	Cruiser.
d.v.	Despatch vessel.
g.b.	Gunboat.
g.v.	Gun-vessel
H.S.	Harveyed steel (in armour column).
I.	Iron hull.
S.	Steel hull.
2 s.	Twin screw.
t.	Turret-ship.
to.cr.	Torpedo-cruiser.
to.g.b.	Torpedo-gunboat.
to.r.	Torpedo-ram.
w.	Wooden hull.

Armament abbreviations. As breech-loading rifled guns are now the most numerous in all fleets, it must be understood that all guns are of that description, unless it be otherwise indicated.

l.	Light guns under 15 cwt., including boats' guns.
M.L.R.	Muzzle-loading rifled guns.
Q.F.	Quick or rapid-firing guns.
f. tu. or b. tu.	Fixed or bow tube for discharging Fish Torpedoes.
sub.	Submerged tube for do.

GREAT BRITAIN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position	Armour. Backing. Deck Plating	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
a.c.	Achilles	I.	9820	380 0	58 3½	27 3	1	4000	Chatham	Penn	1864	444,546	4½	4½	4½	18–10	14 12-ton M.L.R., 2 6-in. M.L.R., 8 3-pr. Q.F., 16 M., 2 l.	..	12·7	750	707
t. 2nd c.	Agamemnon	I.	8660	280 0	66 0	24 0	2	4500	Chatham	Penn	1883	504,065	18–15	16	16	18–9 3	4 38-ton M.L.R., 2 6-in., 6 6-pr. Q.F., 8 3-pr., 5 M., 2 l.	..	12·1	960	410
t. 2nd c.	Ajax	I.	8660	280 0	66 0	24 0	2	4500	Pembroke	Penn	1883	518,357									
a.c.	Agincourt	I.	10,600	400 0	59 5	27 9	1	4000	Birkenh'd	Maudslay	1868	465,477	5½	4½	5½	10	17 12-ton M.L.R., 10 3-pr. Q.F., 7 M., 5 l.	..	12·0	750	687
c.b. 2nd c.	Alexandra	I.	9490	325 0	63 8	26 6	2	7000	Chatham	Humphrys	1877	514,324	12	8–5	8	12–10 1½–1	8 18-ton M.L.R., 4 22-ton, 6 4-in. 4 6-pr. Q.F., 6 3-pr., 13 M., 3 l.	..	14·3	680	408
b. 1st cl.	Anson	S.	10,600	330 0	68 6	27 3	2	11,500	Pembroke	Humphrys	1889	x 724,765	18 comp.	16 comp.	14–12 comp.	10–15 3–2½	4 67-ton, 6 6-in., 12 6-pr. Q.F., 10 3-pr., 7 M., 2 l.	1	16·9	1200	515
c.b. 3rd c.	Audacious	I.	6010	280 0	54 0	23 8	2	3300	Glasgow	Ravenhill	1869	246,482	8	5	6	10	10 12-ton M.L.R., 8 4-in., 4 6-pr. Q.F., 6 3-pr., 6 M., 3 l.	..	11·6	500	492
a.c.	Aurora	S.	5600	300 0	56 0	22 6	2	8500	Pembroke	Thomson	1889	x 284,550	10 comp.	16 comp.	4½	6 3–2	2 22-ton, 10 6-in. Q.F., 6 6-pr., 10 3 pr., 6 M., 3 l.	..	18·0	900	484
a.c.	Australia	S.	5600	300 0	56 0	22 6	2	8500	Glasgow	Napier	1888	259,390									
b. 1st cl.	Barfleur	S. shd.	10,500	360 0	70 0	25 6	2	13,163	Chatham	Greenock Foundry	1894	599,089	12 comp.	12 comp.	9	.. 2½–2	4 29-ton, 10 4·7-in. Q.F., 8 6-pr., 12 3-pr., 7 M., 2 l.	7 (2 sub.)	18·5	1240	606
c.d.s. *c.b.*	Belleisle	I.	4870	245 0	52 0	21 0	2	2600	Poplar	Maudslay	1878	240,000 (purchas'd)	12	9	9	16–9 3–1	4 25-ton M.L.R., 6 6-pr. Q.F., 9 M., 2 l.	..	11·9	510	284
c.b. 3rd c.	Bellerophon	I.	7550	300 0	56 1	6 7	1	4000	Chatham	Penn	1866	322,701	6	5	6	10	10 8-in., 4 6-in., 6 4-in., 4 6-pr. Q.F., 12 M., 4 l.	..	12·4	650	572
b. 1st cl.	Benbow	S.	10,600	330 0	68 6	27 3	2	11,500	Blackwall	Maudslay	1888	760,820	18 comp.	16 comp.	14–2 comp.	12–15 3–2½	2 111-ton, 10 6-in., 8 6-pr. Q.F., 10 3-pr., 7 M., 2 l.	4	16·75	1200	309
b. 1st cl.	Cæsar	S.	14,900	390 0	75 0	27 6	2	12,000	Portsm'th	Maudslay	Bldg.	865,533	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 16 12-pr., 12 3 pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
b. 1st cl.	Camperdown	S.	10,600	330 0	68 6	27 3	2	11,500	Portsm'th	Maudslay	1889	x 769,456	18 comp.	16 comp.	12 comp.	10–15 3–2½	4 67-ton, 6 6-in., 12 6-pr. Q.F., 10 3-pr., 7 M., 2 l.	4	16·9	1200	515
b. 1st cl.	Centurion	S. shd.	10,500	360 0	70 0	25 6	2	13,214	Portsm'th	Greenock Foundry	1893	608,098	12 comp.	12 comp.	9 comp.	.. 2½–2	4 29-ton, 10 4·7-in. Q.F., 8 6-pr., 12 3-pr., 7 M., 2 l.	7 (2 sub.)	18·51	1240	622
b. 1st cl.	Collingwood	S.	9300	325 0	68 0	26 10	2	9500	Pembroke	Humphrys	1886	624,000	18 comp.	16 comp.	12 comp.	17–10 2½	4 45-ton, 6 6-in., Q.F., 12 6-pr. 8 3-pr., 6 M., 2 l.	4	16·50	1200	480
t. 2nd c.	Colossus	S.	9420	325 0	68 0	26 3	2	5500	Portsm'th	Maudslay	1886	646,786	18–14 comp.	16–13 comp.	16 comp.	22–10 3–2½	4 45-ton, 5 6-in., 4 6-pr. Q.F., 10 3-pr., 6 M., 4 l.	..	14·2	970	288
t. 3rd c.	Conqueror	S.	6200	270 0	58 0	24 0	2	6000	Chatham	Humphrys	1882	418,433	12–8½	11½	12	13 2½–1⅞	2 45-ton, 4 6-in., 6 6-pr. Q.F., 12 M., 2 l.	..	15·3	650	330
c.d.s. *t.*	Cyclops	I.	3560	225 0	45 0	16 4	2	1200	Blackwall	Elder	1871	154,026	8–6	9–8	9	11 1½	4 18-ton M.L.R., 4 3-pr. Q.F., 5 M., 1 l.	..	9·9	250	196
t. 2nd c.	Devastation	I.	9330	285 0	62 3	27 6	2	7000	Portsm'th	Maudslay	1873	353,848	12–10	12–10	14	18–16 3–2	4 29-ton, 6 6-pr. Q.F., 8 3-pr., 5 M., 2 l.	2 (2 sub.)	14·0	1800	410
t. 2nd c.	Dreadnought	I.	10,820	320 0	63 10	26 9	2	6500	Pembroke	Humphrys	1875	592,573	14	13	14	18–15 3–2	4 38-ton M.L.R., 6 6-pr. Q.F., 12 3-pr., 7 M., 2 l.	2	13·7	1200	253
t. 2nd c.	Edinburgh	S.	9420	325 0	68 0	26 3	2	5500	Pembroke	Humphrys	1886	642,333	18–14 comp.	16–13 comp.	16 comp.	22–10 3–2½	4 45-ton, 5 6-in., 4 6-pr. Q.F., 10 3-pr., 6 M., 2 l.	2	14·2	970	289
b. 1st cl.	Empress of India	S.	14,150	380 0	75 0	27 6	2	13,000	Pembroke	Humphrys	1893	838,087	8 comp.	16 comp.	17–6 comp.	.. 3	4 67-ton, 10 6-in. Q.F., 16 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	900	730
a.c.	Galatea	S.	5600	300 0	56 0	22 6	2	8500	Glasgow	Napier	1889	258,390	10 comp.	16 comp.	4½	6 3–2	2 21-ton, 10 6-in., Q.F., 6 6-pr. 10 3-pr., 6 M., 3 l.	..	18·1	900	484
c.d.s. *t.*	Glatton	I.	4910	245 0	54 0	19 5	2	2000	Chatham	Laird	1872	219,529	12–10	12	14	20 3–1½	2 25-ton M.L.R., 3 6-pr. Q.F., 4 M., 1 l.	2 (2 sub.)	11·0	540	192
c.d.s. *t.*	Gorgon	I.	3560	225 0	45 0	16 4	2	1200	Jarrow	Ravenhill	1872	138,567	8–6	9–8	10	11 1½	4 18-ton M.L.R., 4 3-pr. Q.F., 5 M., 2 l.	..	9·9	270	192

x Includes Hydraulic Machinery, Gun Mountings, &c.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Bulk-head.	Gun Position	Backing. Deck Plating.	Armament. Guns.	Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
b. 1st cl.	Hannibal	S.	14,900	390 0	75 0	27 6	2	12,000	Pembroke	Harland	Bldg.	867,403	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 16 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
c.d.s. t.	Hecate	I.	3560	225 0	45 0	16 4	2	1200	Poplar	Ravenhill	1872	140,593	8–6	9–8	10	11 1½	4 18-ton M.L.R., 4 3-pr. Q.F., 4 M., 1 l.	..	9·9	270	205
c.b. 3rd c.	Hercules	I.	8680	325 0	59 0½	26 6	1	8500	Chatham	Penn	1868	361,134	9–6	6–5	9	12–10	8 18-ton M.L.R., 2 12½-ton do., 4 6½-ton do., 6 4·7-in. Q.F., 9 6-pr., 13 3-pr. 7 M., 2 l.	4	14·6	610	408
t. 3rd c	Hero	S.	6200	270 0	58 0	24 0	2	6000	Chatham	Rennie	1888	397,271	12 *comp.*	11½ *comp.*	12 *comp.*	13½ 2½–1¾	2 45-ton, 4 6-in., 7 6-pr. Q.F., 5 3-pr., 6 M., 2 l.	..	15·2	620	330
t. 1st cl	Hood	S.	14,150	380 0	75 0	27 6	2	13,000	Chatham	Humphrys	1893	830,536	18 *comp.*	17 *comp.*	18–6 *comp.*	.. 3	4 67-ton, 10 6-in. Q.F., 10 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	900	730
c.d.s. t.	Hotspur	I.	4010	235 0	50 0	21 10	2	2500	Glasgow	Napier	1871	171,528	11 & 8	8	10–8½	15–10 2–1	2 25-ton M.L.R., 2 6-in. 5-ton, 4 6-pr. Q.F., 10 M., 2 l.	..	11·25	300	232
b. 1st cl.	Howe	S.	10,300	325 0	68 0	27 3	2	11,500	Pembroke	Humphrys	1889	667,022	18 *comp.*	16 *comp.*	11½ *comp.*	15–12 3–2½	4 67-ton, 6 6-in. 5-ton, 12 6-pr. Q.F., 10 3-pr., 7 M., 2 l.	1	16·8	1200	515
c.d.s. t.	Hydra	I.	3560	225 0	45 0	16 4	2	1200	Glasgow	Elder	1872	141,372	8–6	9–8	9–10	11–9 1½	4 18-ton M.L.R., 4 3-pr. Q.F., 5 M., 2 l.	..	9·9	250	196
b. 1st cl.	Illustrious	S.	14,900	390 0	75 0	27 6	2	12,000	Chatham	Penn	Bldg.	885,945	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 16 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
a.c.	Immortalité	S.	5600	300 0	56 0	22 6	2	8500	Chatham	Earle	1889	278,500	10 *comp.*	16 *comp.*	4½	6 3–2	2 22-ton, 10 6-in. Q.F., 6 6-pr., 10 3-pr., 6 M., 3 l.	..	18·0	900	484

a.c.	Impérieuse	S. shd.	8400	315 0	62 0	27 4	2	10,000	Portsm'th	Maudslay	1886	x 530,814	10 *comp.*	9 *comp.*	4½ *comp.*	10 4–2	4 24-ton, 10 6-in. Q.F., 8 6-pr., 10 3-pr., 6 M., 2 l.	2	16·7	1130	544
t. 2nd c	Inflexible	I.	11,880	320 0	75 0	26 4	2	6500	Portsm'th	Elder	1881	795,268	24–16	22–14	17 *comp.*	17–25 3	4 80-ton M.L.R., 8 4-in., 4 6-pr. Q.F., 2 3-pr., 15 M., 2 l.	2 (2 sub.)	12·8	1300	485
c.b. 3rd c.	Invincible	I.	6010	280 0	54 0	23 2	2	3500	Glasgow	Napier	1870	239,441	8	5	6	10	10 12-ton M.L.R., 6 4-in., 15 M., 4 l.	..	12·5	500	492
c.b. 3rd c.	Iron Duke	I.	6010	280 0	54 0	23 3	2	3500	Pembroke	Ravenhill	1871	196,479	8	5	6	10	10 12-ton M.L.R., 4 5-in., 4 20-pr., 14 M., 4 l.	..	12·5	500	492
b 1st cl.	Jupiter	S.	14,900	390 0	75 0	27 6	2	12,000	Clydeb'nk	Thomson	Bldg.	893,816									
b 1st cl.	Magnificent	S.	14,900	390 0	75 0	27 6	2	12,000	Chatham	Penn	1895	912,291									
b 1st cl.	Majestic	S.	14,900	390 0	75 0	27 6	2	12,000	Portsm'th	Barrow	1895	910,632	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 16 12-pr., 12 3-pr., 8 M.	5 (4 sub.)	17·5	1850	757
b 1st cl.	Mars	S.	14,900	390 0	75 0	27 6	2	12,000	Birkenh'd	Laird	Bldg.	894,330									
a.c.	Minotaur	I.	10,690	400 0	59 4¾	27 3	1	4000	Blackwall	Penn	1867	456,830	5½	4½	5½	10	17 12-ton M.L.R., 4 4·7-in. Q.F., 8 3-pr. 8 M., 3 l.	..	12·0	750	701
t. 3rd c	Monarch	I.	8320	330 0	57 6	26 7	1	8216	Chatham	Maudslay	1869	354,575	7–6	5–4½	8	12	4 25-ton M.L.R., 2 12-ton do., 1 6½-ton do., 4 12-pr. Q.F., 10 3-pr., 6 M., 2 l.	2	15	630	598
a.c.	Narcissus	S.	5600	300 0	56 0	22 6	2	8500	Hull	Earle	1889	257,390	10 *comp.*	16 *comp.*	4½	6 3–2	2 22-ton, 10 6-in. Q.F., 6 6-pr., 10 3-pr., 6 M., 3 l.	..	18·1	900	484
a.c.	Nelson	I. shd.	7630	280 0	60 0	26 6	2	5500	Glasgow	Elder	1880	390,855	9–6	9–6	6	13–10 3–2	4 18-ton M.L.R., 8 12-ton, 4 4·7-in. Q.F., 6 6-pr., 14 3-pr., 7 M., 3 l.	..	13·6	1150	580
a.c	Northampton	I. shd.	7630	280 0	60 0	25 9	2	4500	Glasgow	Penn	1878	395,804	9–6	9–6	6	13–10 3–2	4 18-ton M.L.R., 8 12-ton, 6 6-pr. Q.F., 8 3-pr., 10 M., 3 l.	..	12·6	1150	580
t. 2nd c.	Neptune	I. shd.	9310	300 0	63 0	26 1	1	6000	Poplar	Penn	1878	600,000 (purchas'd)	12–9	8–6	11–13	11–13 3–2	4 38-ton M.L.R., 2 12-ton, 6 6-pr. Q.F., 8 3-pr., 11 M., 2 l.	..	13·4	670	412
t. 1st cl.	Nile	S.	11,940	345 0	73 0	27 6	2	12,000	Pembroke	Maudslay	1890	819,717	20–16 *comp.*	18–14 *comp.*	18 *comp.*	6 3	4 67-ton, 6 4·7-in. Q.F., 8 6-pr., 12 3-pr., 7 M., 3 l.	4 (2 sub.)	16·7	1200	558

x Includes Hydraulic Machinery, Gun Mountings, &c.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position.	Armour. Backing, Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
a.c.	Northumberland	I.	10,780	400 4	59 5	27 1	1	4381	Millwall	Penn	1868	471,352	5½	4½	5½	10	7 12-ton M.L.R., 20 9-ton, 1 6-in., 1 5-in., 6 4·7-in. Q.F., 10 3-pr., 6 M., 5 l.	..	13·3	756	701
c.d.s.	Orion	I.	4870	245 0	52 0	21 4	2	2600	Poplar	Maudslay	1882	292,229	12–7	9–5	8	16–9 3–1	4 25-ton M.L.R., 6 6-pr. Q.F., 8 M., 2 l.	..	11·9	520	284
a.c.	Orlando	S.	5600	300 0	56 0	22 6	2	8500	Jarrow	Palmer	1888	266,812	10 *comp.*	16 *comp.*	4½ *comp.*	6 3–2	2 22-ton, 10 6-in., 6 6-pr. Q.F., 10 3-pr., 7 M., 3 l.	..	18·1	900	484
c.d.s. *c.b.*	Penelope	I.	4470	260 0	50 0	17 6	2	2700	Pembroke	Maudslay	1868	186,848	6–5	4½	5	10–11	8 9-ton M.L.R., 4 3-pr. Q.F., 11 M., 4 l.	..	11·0	470	265
c.d.s. *t.*	Prince Albert	I.	3880	240 0	48 1	20 4	1	1300	Poplar	Humphrys	1866	202,666	4½	5	4½	18 ¾	4 12-ton M.L.R., 6 M., 2 l.	..	9·7	230	205
b. 1st cl.	Prince George	S.	14,900	390 0	75 0	27 6	2	12,000	Portsm'th	Humphrys	Bldg.	885,037	9 H.S.	14–9 H.S.	14–6 H.S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 16 12-pr., 12 3-pr., 2 l.	5 (4 sub.)	17·5	1850	757
b. 1st cl.	Renown	S. shd.	12,350	380 0	72 0	26 9	2	12,000	Pembroke	Maudslay	1896	696,425	8–6 H.S.	10–6 H.S.	10 H.S.	.. 3–2	4 10-in. 29-ton, 10 6-in. Q.F., 8 12-pr., 12 3-pr., 7. M., 2 l.	5 (2 sub.)	18·0	800	674
b. 1st cl.	Ramillies	S.	14,150	380 0	75 0	27 6	2	13 000	Glasgow	Thomson	1893	874,255									
b. 1st cl.	Repulse	S.	14,150	380 0	75 0	27 6	2	13 000	Pembroke	Humphrys	1894	841,274									
b. 1st cl.	Resolution	S.	14,150	380 0	75 0	27 6	2	13,000	Jarrow	Palmer	1893	852,755	18–5 *comp.*	16 *comp.*	17 *comp.*	.. 3	4 67-ton, 10 6-in. Q.F., 16 6-pr., 12 3-pr., 8 M., 2 l.	5 (2 sub.)	17·5	900	730
b. 1st cl.	Revenge	S.	14,150	380 0	75 0	27 6	2	13,000	Jarrow	Palmer	1895	852,755									
b. 1st cl.	Royal Oak	S.	14,150	380 0	75 0	27 6	2	13,000	Birkenh'd	Laird	1894	877,378									
b. 1st cl.	Royal Sovereign	S.	14,150	380 0	75 0	27 6	2	13,312	Portsm'th	Humphrys	1892	824,583									
b. 1st cl.	Rodney	S.	10,300	325 0	68 0	27 3	2	11,500	Chatham	Humphrys	1888	669,278	18 *comp.*	16 *comp.*	11 *comp.*	15–12 3–2½	1 69-ton, 3 67-ton, 6 6-in. 5-ton, 12 6-pr. Q.F., 10 3-pr., 6 M., 2 l.	..	16·75	1200	515
c.d.s. *t.*	Rupert	I.	5440	250 0	53 0	23 7	2	6000	Chatham	Portsm'th	1874	232,677	11–9	12	14–12	14–10 3–2	2 22-ton, 2 6-in., 4 6-pr. Q.F., 6 3-pr., 2 M., 2 l.	..	14·0	480	293
t. 1st cl.	Sans Pareil	S.	10,470	340 0	70 0	27 3	2	14,000	Blackwall	Humphrys	1889	*x* 719,442	16–18 *comp.*	16 *comp.*	18 *comp.*	6 3	2 111-ton, 1 29-ton, 12 6-in., 12 6-pr. Q.F., 12 3-pr., 8 M., 2 l.	4 (2 sub.)	17·2	1200	583
c.d.s. *t.*	Scorpion	I.	2750	224 6	42 4½	16 11	1	1000	Birkenh'd	Laird	1865	110,573	4½	..	5	10–8	4 12-ton. M.L.R., 6 M., 1 l.	..	8·5	320	151
a.c.	Shannon	I. shd.	5390	260 0	54 0	23 4	1	2500	Pembroke	Laird	1877	287,169	9–6	9–8	9	10–12 3–1	2 18-ton M.L.R., 7 12-ton, 11 M., 8 l.	..	11·2	580	156
c.b. 3rd c.	Sultan	I.	9290	325 0	59 0½	27 6	1	8000	Chatham	Thomson	1871	357,415	9–6	6–4½	9–8	12–10	8 18-ton M.L.R., 4 12½-ton do., 4 4·7-in. Q.F. 9 6-pr. 13 3-pr., 7 M., 2 l.	4	14·0	810	661
c.b. 2nd c.	Superb	I.	9170	332 3	59 0	26 5	1	8500	Blackwall	Maudslay	1880	443,000 (purchas'd)	12–10	10–5	10	7–12 1½	16 18-ton M.L.R., 6 4-in., 6 6-pr. Q.F., 10 3-pr., 6 M., 3 l.	..	15·0	970	654
c.b. 3rd c.	Swiftsure	I. shd.	6910	280 0	55 0	26 0	1	3500	Jarrow	Maudslay	1872	257,081	8–6	6–4	6	10	10 12-ton M.L.R., 8 4-in., 4 3-pr. Q.F., 12 M., 3 l.	..	12·6	540	497
c.b. & *b.* 2nd c.	Temeraire	I. shd.	8540	285 0	62 0	27 2	2	6500	Chatham	Humphrys	1877	454,969	11–8	8–5	10–8	12–10 1½–1	4 25-ton M.L.R., 4 18-ton, 6 4-in., 4 6-pr. Q.F., 10 3-pr., 8 M., 4 l.	..	13·8	620	592
t. 2nd c.	Thunderer	I.	9330	285 0	62 3	27 0	2	7000	Pembroke	Maudslay	1877	358,542	12–10	12–10	14-12	18–16 3–2	4 10-in. 29-ton, 6 6-pr. Q.F., 8 3-pr., 4 M., 2 l.	2	14·0	1600	410
t. 1st cl.	Trafalgar	S.	11,940	345 0	73 0	27 6	2	12,000	Portsm'th	Humphrys	1890	*x* 862,794	20–16 *comp.*	18–14 *comp.*	18 *comp.*	6 3	4 67-ton, 6 4·7-in. Q.F., 8 6-pr., 12 3-pr., 6 M., 3 l.	4 (2 sub.)	16·7	1200	572
c.b. 3rd c.	Triumph	I. shd.	6640	280 0	55 0	26 2	1	3500	Jarrow	Maudslay	1873	258,322	8–6	6–4	6	10	10 12-ton M.L.R., 4 5-in., 8 6-pr. Q.F., 8 3-pr., 5 M., 3 l.	..	12·6	550	497
a.c.	Undaunted	S.	5600	300 0	56 0	22 6	2	8500	Jarrow	Palmer	1889	256,055	10 *comp.*	16 *comp.*	4½ *comp.*	6 3–2	2 22-ton, 10 6-in., 6 6-pr. Q.F., 10 3-pr., 7 M., 3 l.	..	18·1	900	484

x Includes Hydraulic Machinery, Gun Mountings, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position.	Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
b. 1st cl.	Victorious	S.	14,900	390 0	75 0	27 6	2	12,000	Chatham	Hawthorn	bldg.	868,313	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 16 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
a.c.	Warspite	S.	8400	315 0	62 0	27 4	2	10,000	Chatham	Penn	1888	529,332	10 *comp.*	9 *comp.*	8 *comp.*	10 3–2	4 22-ton, 10 6-in., 4 6-pr. Q.F., 9 3-pr., 6 M., 2 l.	2	16·7	1130	535
c.d.s. t.	Wivern	I.	2750	224 6	42 4	17 0	1	1000	Birkenh'd	Laird	1865	116,514	4½	..	5	8–10	4 12-ton M.L.R., 8 M., 1 l.	..	8·5	300	151
b. 1st cl.	New Renown	S.	12,900	390 0	74 0	25 5	2	15,000	Portsm'th	..	..	..									
b. 1st cl.	New Renown	S.	12,900	390 0	74 0	25 5	2	15,000	Devonport	..	..	..									
b. 1st cl.	New Renown	S.	12,900	390 0	74 0	25 5	2	15,000	Chatham	..	..	..	8 H. S.	6 H. S.	10 H. S.	3–2	4 12-in., 12 6-in. Q.F., 16 12-pr., 12 3-pr., 2 l.	5 (4 sub.)	18·75	1850	700
b. 1st cl.	New Renown	S.	12,900	390 0	74 0	25 5	2	15,000	Contract	..	..	..									
b. 1st cl	New Renown	S.	12,900	390 0	74 0	25 5	2	15,000	Contract	..	..	..									
The following, which appear in the Official Navy List, belong to India and Australia:—																					
c.d.s. t.	Abyssinia* (*Indian Marine.*)	I.	2900	225 0	42 0	14 66	2	900	Poplar	Dudgeon	1870	116,519	7–6	8–7	10–8	11–9 1½–1	4 8-in. 14-ton, 7 M., 2 l.	..	9·0	92	193
c.d.s. t.	Cerberus† (*Colonial Marine.*)	I.	3480	225 0	45 0	15 3	2	1660	Jarrow	Maudslay	1870	117,556	8–6	9–8	10–9	11–9 1½–1	4 10-in. 18-ton M.L.R., 4 M.	..	9·75	120	196
c.d.s. t.	Magdala* (*Indian Marine.*)	I.	3340	225 0	45 0	15 3	2	1400	Blackwall	Ravenhill	1870	132,400	8–6	9–8	10–9	11–9 1½–1	4 8-in. 14-ton, 7 M., 2 l.	..	10·0	120	194

* At Bombay. † At Melbourne.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
Sloop	Acorn	C.	970	167 0	32 0	14 0	1	1200	Milford Haven	Maudslay	1884	42,000	..	..	8 5-in. 38-cwt., 8 M., 1 l.	..	12·2	150	126
2nd cl. Cr.	Active	I. shd.	3080	270 0	42 0	21 4	1	2100	Blackwall	Humphrys	1869	126,156	..	..	10 6-in., 2 64-pr. M.L.R., 9 M., 2 l.	..	15·10	410	339
" "	Æolus	S. shd.	3600	300 0	43 0	17 6	2	9000	Devonp'rt	Hawthorn	1892	208,450	4½	2-1	2 6-in. Q.F., 6 4·7-in. 8 6-pr. 1 3-pr., 4 M., 1 l.	4	19·75	400	273
Dsp. Ves.	Alacrity	S.	1700	250 0	32 6	14 [illegible]	2	3000	Jarrow	Palmer	1885	77,969	..	..	10 6-pr. Q.F., 2 M.	..	17·00	400	114
T. G. B.	Alarm	S.	810	230 0	27 0	8 9	2	3884	Sheerness	Penn	1892	59,346	4½	..	2 4·7-in. Q.F., 4 3-pr. do.	5	19·25	100	91
2nd cl. G. B.	Albacore	C.	560	135 0	26 0	10 6	1	500	Birkenh'd	Laird	1883	28,556	..	..	2 5-in., 2 4-in., 2 M.	..	11·0	85	59
Sloop	Alert	S. shd.	960	180 0	32 6	11 6	1	1400	Sheerness	Sheerness	1894	60,309	..	..	6 4-in. 25-pr. Q.F., 4 3-pr., 2 M.	..	13·25	130	101
"	Algerine	S.	1050	185 0	32 6	11 3	2	1400	Devonp'rt	Devonport	1895	63,904	·22	..	6 4-in. 25-pr. Q.F., 4 3-pr., 3 M.	..	13·0	160	106
2nd cl. Cr.	Amphion	S.	4300	300 0	46 0	20 6	2	5000	Pembroke	Maudslay	1883	160,500	..	1½	10 6-in., 4 3-pr. Q.F., 13 M., 2 l.	..	16·6	1000	309
" "	Andromache	S.	3400	300 0	43 0	16 6	2	9000	Chatham	Earle	1890	186,280	4½	2-1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
" "	Apollo	S.	3400	300 0	43 0	16 6	2	9000	Chatham	Earle	1891	186,361							
1st cl. Cr.	Andromeda	S.	11,000	435 0	69 0	26 0	2	16,500	Pembr ke	Hawthorn	Bldg.	..	4½	3-6	16 6-in., 14 12-pr., 12 3-pr., 2 12-pr. boat.	3 (3 sub.)	20·0	1000	600
T. G. B.	Antelope	S.	810	230 0	27 0	8 9	2	3621	Devonp'rt	Yarrow	1893	61,397	4½	..	2 4·7-in. Q.F., 4 3-pr.	5	19·25	100	91
3rd cl. Cr.	Archer	S.	1770	225 0	36 0	14 6	2	3500	Glasgow	Thomson	1885	x87,583	..	..	6 6-in. 8 3-pr. Q.F., 2 M., 1 l.	1	16 5	475	172

x Includes Gun Mountings, &c.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
2nd cl. Cr.	Arethusa	S.	4300	300 0	46 0	20 6		5000	Glasgow	Napier	1882	145,198		1½	10 6-in., 8 3-pr. Q.F., 6 M., 2 l.	..	16·6	1000	309
" "	Arrogant	S.	5800	320 0	57 6	22 0	2	10,000	Devonp'rt	Earle	Bldg.	..	4½	1–2 N. S.	4 6-in., Q.F., 6 4·7-in., 8 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·5	500	450
" "	Astrea	S. shd.	4360	320 0	49 6	19 0	2	9112	Devonp'rt	Devonport	1893	244,831	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr. 1 3-pr., 4 M., 1 l.	2	19·75	400	312
3rd cl. Cr.	Barham	S.	1830	280 0	35 0	13 3	2	4700	Portsm'th	Hawthorn	1889	113,302	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	..	18·6	140	169
" "	Bellona	S.	1830	280 0	35 0	13 3	2	4700	Newcastle	Hawthorn	1890	94,195	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	..	17·8	140	169
" "	Barracouta	S.	1580	220 0	35 0	14 0	2	3000	Sheerness	Palmer	1889	96,315	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	..	16·5	160	159
" "	Barrosa	S.	1580	220 0	35 0	14 0	2	3000	Portsm'th	Palmer	1889	79,238	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	..	16·5	160	159
" "	Blanche	S. shd.	1580	220 0	35 0	14 0	2	3000	Pembroke	Earle	1889	91,112	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	..	16·5	160	159
" "	Blonde	S. shd.	1580	220 0	35 0	14 0	2	3000	Pembroke	Earle	1889	90,059	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	..	16·5	160	159
Sloop	Basilisk	S. shd.	1170	195 0	28 0	12 6	2	2000	Sheerness	Rennie	1889	58,013	..	..	8 5-in., 8 M.	..	14·7	160	138
"	Beagle	S. shd.	1170	195 0	28 0	12 6	2	2000	Portsm'th	Rennie	1889	56,474							
1st cl. Cr.	Blake	S.	9000	375 0	65 0	25 9	2	20,000	Chatham	Maudslay	1889	440,471	6	6–3	2 22-ton, 10 6-in. Q.F., 16 3-pr. Q.F., 7 M., 2 l.	2 (2 sub.)	21·5	1500	570
" "	Blenheim	S.	9000	375 0	65 0	25 9	2	21,411	Blackwall	Humphrys	1890	425,591							
2nd cl. Cr.	Bonaventure	S. shd.	4360	320 0	49 6	19 0	2	9000	Devonp'rt	Hawthorn	1892	247,128	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr. 4 M., 1 l.	2	19·5	400	312
T. G. B.	Boomerang (Australia)	S.	735	230 0	27 0	8 3	2	3500	Elswick	Bellis	1889	49,962	4½	..	2 4·7-in. Q.F., 4 3-pr., 1 M.	1	20·0	100	91
1st cl. G. B.	Bramble	C.	715	165 0	29 0	11 0	2	1000	Belfast	Harland	1886	49,835	..	..	6 4-in., 4 M.	..	13·0	105	76
2nd cl. Cr.	Brilliant	S. shd.	3600	300 0	43 8	17 6	2	9164	Sheerness	Hawthorn	1891	204,228	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	2	19·7	400	273
3rd cl. Cr.	Brisk	S.	1770	225 0	36 0	14 3½	2	3500	Glasgow	Thomson	1886	87,583	..	..	6 6-in., 8 3-pr., Q.F., 2 M., 1 l.	1	16·5	325	172
Sloop	Buzzard	C.	1140	195 0	28 0	11 6	2	2000	Sheerness	Barrow	1887	58,700	..	..	8 5-in., 8 M.	..	14·50	160	138
3rd cl. Cr.	Calliope	S. shd.	2770	235 0	44 6	19 11	1	4020	Portsm'th	Rennie	1884	120,000	..	1½	4 6-in., 12 5-in. 38-cwt., 10 M., 2 l.	..	14·6	550	293
" "	Calypso	S. shd.	2770	235 0	44 6	19 11	1	4000	Chatham	Rennie	1883	119,500							
2nd cl. Cr.	Cambrian	S. shd.	4360	320 0	49 6	19 0	2	9000	Pembroke	Hawthorn	1893	236,919	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M, 1 l.	2	19·5	400	312
3rd cl. Cr.	Caroline	C.	1420	200 0	38 0	15 9	1	1400	Sheerness	Maudslay	1882	71,000	..	1¼	14 5-in. 38-cwt., 8 M., 1 l.	..	12·6	400	169
" "	Canada	S. shd.	2380	225 0	44 6	19 1	1	2000	Portsm'th	Rennie	1881	104,500	..	1½	10 6-in., 8 M., 2 l.	..	12·75	470	265
" "	Carysfort	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow	Elder	1878	114,454	..	1½	2 90-cwt. M.L.R., 12 64-pr., 6 M., 2 l.	..	12·75	470	265
" "	Champion	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow	Elder	1878	113,983	..	1½	4 6-in., 8 5-in., 4 3-pr., Q.F., 6 M., 2 l.	..	12·75	470	265
" "	Cleopatra	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow	Humphrys	1878	113,924	..	1½	4 6-in., 8 5-in., 4 3-pr. Q.F., 6 M., 2 l.	..	13·0	470	265
" "	Comus	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow	Elder	1878	113,974	..	1½	10 6-in., 8 M., 2 l.	..	12·75	470	265

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tub s.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
3rd cl. Cr.	Conquest	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow	Humphrys	1878	110,912	..	1½	9 6-in., 8 M., 2 l.	..	13·0	470	265
„ „	Constance	S. shd.	2380	225 0	44 6	19 3	1	2000	Chatham	Penn	1880	110,000	..	1½	2 90-cwt. M.L.R., 12 64-pr., 6 M., 2 l.	..	13·0	470	265
„ „	Cordelia	S. shd.	2380	225 0	44 6	19 3	1	2000	Portsm'th	Rennie	1881	104,500	..	1½	10 6-in., 10 M., 2 l.	..	12·75	470	265
2nd cl. Cr.	Charybdis	S. shd.	4360	320 0	49 6	19 0	2	9000	Sheerness	Earle	1893	237,344	4½	2–1	2 6-in. Q.F., 8 4·7-in, 8 6-pr., 1 3-pr., 4 M., 1 l.	2	19·5	400	312
T. G. B.	Circe	S.	810	230 0	27 0	8 9	2	3500	Sheerness	Penn	1892	61,979	4½	..	2 4·7-in. Q.F., 4 3-pdr.	5	19·25	100	91
2nd cl. G. B.	Cockchafer	C.	465	125 0	23 6	9 6	1	360	Pembroke	Maudslay	1881	77,000	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·8	40	61
3rd cl. Cr.	Cossack	S	1770	225 0	36 0	14 3½	2	3500	Glasgow	Thomson	1886	*x* 87,583	..	..	6 6-in., 8 3-pr. Q.F., 2 M., 1 l.	1	16·5	325	172
1st cl. Cr.	Crescent	S. shd.	7700	360 0	60 0	23 9	2	12,000	Portsm'th	Penn	1892	383,068	6	5–1	1 22-ton, 12 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	2 (2 sub.)	19·7	850	560
3rd cl. Cr.	Curaçoa	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow	Humphrys	1878	112,931	..	1½	4 6-in., 8 5-in., 1 3-pr. Q.F., 9 M., 2 l.	..	13·0	470	265
1st cl. Gun Ves.	Curlew	S.	950	195 0	28 0	10 6	2	1200	Devonp'rt	Penn	1885	*x* 49,963	..	..	1 6-in. 3 5-in., 7 M.	1	11·5	250	103
Sloop	Daphne	C.	1140	195 0	28 0	11 6	2	2000	Sheerness	Greenock F'ndry Co.	1888	*x* 57,600	..	..	8 5-in., 8 M.	..	14·0	160	138
1st cl. Cr.	Diadem	S. shd.	11,000	435 0	69 0	26 0	2	16,500	Govan	Fairfield	Bldg	..	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat	3 (2 sub.)	20·5	1000	600
2nd cl. Cr.	Diana	S. shd.	5600	350 0	54 0	21 0	2	9600	Govan	Fairfield	1895	249,332							
„ „	Dido	S.	5600	350 0	54 0	21 0	2	9600	Glasgow	London and Glasgow Co.	1896	252,278	4½	2¼	5 6-in. Q.F., 6 4·7-in., 8 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	3 (2 sub.)	19·5	550	450
„ „	Doris	S. shd.	5600	350 0	54 0	21 0	2	9600	Barrow	Barrow	Bldg.	254,029							

Class.	NAME	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tub s.	Speed.	Normal Coal Supply.	Complement.
Sloop	Dolphin	C.	925	157 0	32 0	14 0	1	750	Middl'sbro	Hawthorn	1882	*x* 35,650	4½	..	2 6-in., 2 5-in., 3 M., 2 l.	..	11·3	135	115
T. G. B.	Dryad	S.	1070	250 0	30 6	9 0	2	3500	Chatham	Maudslay	1893	73,491	4½	..	2 4·7-in. Q.F., 4 6-pr.	5	19·0	100	120
2nd cl. Cr.	Eclipse	S. shd.	5600	350 0	53 0	20 3	2	9600	Portsm'th	Portsm'th	1894	279,345	4½	1½–3	5 6-in. Q.F., 6 4·7-in., 8 12-pr., 1 3-pr., 4 M., 1 2-pr. boat.	5 (2 sub.)	19·5	550	437
1st cl. Cr.	Edgar	S.	7350	360 0	60 0	23 9	2	12,000	Devonp'rt	Elder	1890	401,083	6	5–1	2 22-ton, 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·5	850	544
„ „	Endymion	S.	7350	360 0	60 0	23 9	2	12,000	Hull	Earle	1891	350,459							
Sloop	Egeria	C.	940	160 0	31 4	14 3	1	700	Pembroke	Humphrys	1873	42,882	..	..	4 20-pr., 2 M., 1 l.	..	11·3	100	122
„	Espiegle	C.	1130	170 0	36 0	16 3	1	800	Devonp'rt	Maudslay	1880	48,770	..	..	10 5-in., 8 M., 1 l.	..	11·5	150	138
1st cl. Cr.	Europa	S. shd.	11,000	435 0	69 0	26 0	2	16,500	Clydeb'nk	Thomson	Bldg.	..	4½	4	16 6-in. Q.F., 14 12-pr., 12 3-pr., 7 M.	3 (2 sub.)	20·5	1000	600
3rd cl. Cr.	Fearless	S.	1580	220 0	34 3	14 6	2	3200	Barrow	Barrow	1886	*x* 87,452	..	..	4 5-in., 8 3-pr. Q.F., 2 M., 1 l.	3 (1 sub.)	16·7	450	147
2nd cl. G. B.	Firebrand	C.	455	125 0	23 6	10 0	1	360	Glasgow	Thomson	1877	22,800	..	..	2 5-in., 2 4-in., 2 M.	..	10·17	40	61
2nd cl. Cr.	Flora	S. shd.	4360	320 0	49 6	19 0	2	9000	Pembroke	Barrow	1893	241,819							
„ „	Forte	S. shd.	4360	320 0	49 6	19 0	2	9000	Chatham	Chatham	1893	240,816	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	2	19·5	400	312
„ „	Fox	S. shd.	4360	320 0	49 6	19 0	2	9000	Portsm'th	Portsm'th	1893	244,078							
„ „	Forth	S.	4050	300 0	46 0	20 0	2	5700	Pembroke	Hawthorn	1886	201,952	4	3–2	2 15-ton, 10 6-in., 3 6-pr. Q.F., 8 3-pr., 6 M., 2 l.	2	16·8	900	326
„ „	Furious	S. shd.	5800	320 0	57 6	22 0	2	10,000	Devonp'rt	Earle	Bldg.	..	4½	1–2	4 6-in. Q.F., 6 4·7 in., 8 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·0	500	450
„ „	Gladiator	S. shd.	5800	320 0	57 6	22 0	2	10,100	Portsm'th	Maudslay	Bldg.	..							
Sloop	Gannet	C.	1130	170 0	36 0	15 9	1	800	Sheerness	Humphrys	1878	52,470	..	..	2 90-cwt. M.L.R., 3 64-pr., 2 5-in. 38-cwt., 6 M., 1 l.	..	11·53	150	152

x Includes Gun Mountings, &c.

GREAT BRITAIN.—Cruising Ships, &c.—*continued*.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. D ck.	Armament. Guns.	Armament. T'rpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no					£	in.	in.			knots.	tons.	
3rd cl. Cr.	Garnet	C.	2120	220 0	40 0	19 7	1	1800	Chatham	Hawthorn	1877	92,468	..	..	14 5-in. 40-cwt., 7 M., 2 l.	..	12·2	260	236
1st cl. Cr.	Gibraltar	S. shd.	7700	360 0	60 0	23 9	2	12,000	Glasgow	Napier	1892	317,634	6	5–1	2 22-ton, 10 6-in. Q.F. 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	419
T. G. B.	Gleaner	S.	735	230 0	27 0	8 3	2	3600	Sheerness	Sheerness	1890	63,798	4½	..	2 4·7-in. Q.F., 4 3-pr.	1	19·0	100	91
"	Gossamer	S.	735	230 0	27 0	8 3	2	3600	Sheerness	Sheerness	1890	54,490							
1st cl. G. B.	Goldfinch	C.	805	165 0	31 0	11 7½	1	1200	Sheerness	Sheerness	1889	40,889	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
1st cl. Cr.	Grafton	S.	7350	360 0	60 0	23 9	2	12,000	Blackwall	Humphrys	1892	351,851	6	5–1	2 22-ton, 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	544
T. G. B.	Grasshopper	S.	525	200 0	23 0	8 9	2	2700	Sheerness	Maudslay	1887	x 31,065	..	..	1 4-in., 6 3-pr. Q.F.	2	17·0	80	67
" "	Halcyon	S.	1070	250 0	30 6	9 0	2	3500	Devonp'rt	Hawthorn	1894	75,091	4½		2 4·7-in. Q.F., 4 6-pr.	5	19·0	100	120
"	Harrier	S.	1070	250 0	30 6	9 0	2	3500	Devonp'rt	Hawthorn	1894	73,428							
1st cl. Cr.	Hawke	S.	7350	360 0	60 0	23 9	2	12,000	Chatham	Elder	1891	365,491	6	5–1	2 22-ton, 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	544
T. G. B.	Hazard	S.	1070	250 0	30 6	9 0	2	3500	Pembroke	Elder	1894	74,076	4½		2 4·7-in. Q.F., 4 6-pr.	5	19·0	100	120
" "	Hebe	S.	810	230 0	27 0	8 9	2	3566	Sheerness	Sheerness	1892	73,433	4½		2 4·7-in. Q.F., 4 3-pr.	5	19·25	100	91
T. D. S.	Hecla	I.	6400	391 7	38 9	24 3	1	2400	Belfast	Harland & Wolff	1878	126,190	..		4 64-pr. M.L.R., 1 5-in., 1 40-pr., 14 M.	3	13·0	2,200	277
2nd cl. Cr.	Hermione	S. shd.	4360	320 0	49 6	19 0	2	9000	Devonp'rt	Thomson	1893	223,267	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr. 4 M., 1 l.	2	19·5	400	312
3rd cl. Cr.	Heroine	C.	1420	200 0	38 0	15 9	1	950	Devonp'rt	Humphrys	1881	67,000	..	1¼	8 6-in., 4 M., 1 l.	..	11·4	400	168
" "	Hyacinth																		
T. G. B.	Hussar	S.	1070	250 0	30 6	9 0	2	3500	Devonp'rt	Hawthorn	1894	72,886	4½	..	2 4·7-in. Q.F., 4 6-pr.	5	19·0	100	120
Sloop	Icarus	C.	970	167 0	32 0	13 6	1	1200	Devonp'rt	Barrow	1885	x 52,104	..	..	8 5-in., 4 3-pr. Q.F., 4 M. 1 l.	..	12·2	150	126
2nd cl. Cr.	Inconstant	I. shd.	5780	337 4	50 3	25 6	1	4200	Pembroke	Penn	1868	213,324	..	..	10 12-ton M.L.R., 6 6½-ton, 2 3-pr. Q.F., 11 M., 8 l.	..	16·20	750	631
" "	Indefatigable	S. shd.	3600	300 0	43 8	17 6	2	9000	Glasgow	London and Glasgow	1891	181,024							
" "	Intrepid	S. shd.	3600	300 0	43 8	17 6	2	9000	Glasgow	London and Glasgow	1891	181,157	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	2	19·75	400	273
" "	Iphigenia	S. shd.	3600	300 0	43 8	17 6	2	9000	Glasgow	London and Glasgow	1891	181,879							
" "	Iris	S.	3730	300 0	46 0	22 0	2	6000	Pembroke	Maudslay	1877	213,186	..	..	13 5-in., 4 3-pr. Q.F., 8 M., 1 l.	..	18·0	780	450
" "	Isis	S. shd.	5600	350 0	54 0	21 0	2	9600	Glasgow	London and Glasgow Co.	Bldg.	252,067	4½	2½	5 6-in. Q.F., 6 4·7-in., 8 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	3 (2 sub.)	19·5	550	450
" "	Juno	S. shd.	5600	350 0	54 0	21 0	2	9600	Barrow	Barrow	1895	254,097							
T. G. B.	Jaseur	S.	810	230 0	27 0	8 9	2	3711	Barrow	Barrow	1892	48,238	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
" "	Jason	S.	810	230 0	27 0	8 9	2	3540	Barrow	Barrow	1892	49,253							
" "	Karrakatta (Australia)	S.	735	230 0	27 0	8 3	2	3500	Elswick	Bellis	1890	x 47,619	4½	..	2 4·7-in. Q.F., 4 3-pr.	1	20·0	100	91
3rd cl. Cr.	Katoomba (Australia)	S.	2575	265 0	41 0	15 6	2	7500	Elswick	Hawthorn	1889	116,719	4½	2–1	8 4·7-in. Q.F., 8 3-pr. 4 M., 1 l.	2	19·0	300	217
1st cl. G. V.	Landrail	S.	950	195 0	28 0	10 6	2	1200	Devonp'rt	Penn	1886	49,963	..	..	1 6-in., 3 5-in., 4 3-pr. Q.F., 3 M.	..	14·5	250	46
1st cl. G. B.	Lapwing	C.	805	165 0	31 0	11 7½	2	1200	Devonp'rt	Devonport	1889	39,952	..	..	6 4-in. 25-cwt., 2 3-pr. Q.F., 2 M.	..	13·0	105	76

x Includes Gun Mountings, &c.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.						in.	in.			knots.	tons.	
2nd cl. Cr.	Latona	S.	3400	300 0	43 0	16 6	2	9000	Barrow	Barrow	1890	171,068	4½	2–1	2 6-in.Q.F.,6 4·7-in.,8 6-pr.,1 3-pr., 4 M., 1 l.	4	20·0	400	273
" "	Leander	S.	4300	300 0	46 0	20 6	2	5000	Glasgow	Napier	1882	148,453	..	1½	10 6-in. 5-ton, 4 3-pr. Q.F., 14 M., 2 l.	..	16·6	1000	309
T. G. B.	Leda	S.	810	230 0	27 0	8 9	2	3597	Sheerness	Penn	1892	62,145	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
2nd cl. G. V.	Linnet	C.	756	165 0	29 0	10 11	2	870	Blackwall	Rennie	1880	35,663	..	..	2 90-cwt. M.L.R., 4 6-pr. Q.F., 2 M.	..	11·80	180	92
1st cl. G. B.	Lizard	C.	715	165 0	29 0	11 10	1	1000	Belfast	Harland	1886	52,770	..	..	6 4-in., 4 M.	..	13·0	105	76
3rd cl. Crs.	Magicienne, Marathon	S. shd.	2950	265 0	42 0	17 6	2	9000	Glasgow	Hawthorn	1888	136,000	..	1½	6 6-in., 9 6-pr. Q.F., 1 3-pr., 3 M., 1 l.	2	19·0	400	218
1st cl. G. B.	Magpie	C.	805	165 0	31 0	11 7½	1	1200	Pembroke	Earle	1889	x 38,700	..	..	6 4-in., 4 M.	..	13·0	105	76
Sloop	Mariner	C.	970	167 0	32 0	14 0	1	850	Devonp'rt	Hawthorn.	1884	49,997	..	..	8 5-in., 38-cwt., 8 M., 1 l.	..	11·50	150	..
3rd cl. Crs.	Medea, Medusa	S.	2800	265 0	41 0	16 6	2	9000	Chatham	Humphrys	1888	x 141,700	..	1½	6 6-in., 9 6-pr. Q.F., 1 3-pr., 3 M., 1 l.	2	19·0	400	218
2nd cl. Cr.	Melampus	S.	3400	300 0	43 0	16 6	2	9000	Barrow	Barrow	1890	171,635	4½	2–1	2 6-in. Q.F., 6 4·7 in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
Sloop	Melita	C.	970	167 0	32 0	13 6	1	1200	Malta	Malta Dock Yard	1888	60,179	..	..	8 5-in., 8 M., 1 l.	..	12·50	150	125
3rd cl. Cr.	Melpomene	S. shd.	2950	265 0	41 0	17 6	2	9000	Portsm'th	Palmer Co.	1888	x 142,000	..	1½	6 6-in., 9 6-pr. Q.F., 1 3-pr., 3 M., 1 l.	2	19·0	400	218

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
2nd cl. Cr.	Mercury		3730	300 0	46 0	20 2	2	6000	Pembroke	Maudslay	1878	213,252	..	..	13 5-in., 4 3-pr. Q.F., 9 M., 1 l.	..	16·8	780	291
" "	Mersey	S.	4050	300 0	46 0	19 6	2	6000	Chatham.	Humphrys.	1885	154,000	4	3–2	2 15-ton, 10 6-in., 3 6-pr.Q.F., 8 3-pr. 5 M., 2 l.	..	17·3	900	327
3rd cl. Cr.	Mildura (Spl. for Australia)	S.	2575	265 0	41 0	15 6	2	7500	Elswick	Hawthorn.	1889	116,062	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	2	19·0	300	217
2nd cl. Cr.	Minerva	S. shd.	5600	350 0	53 0	20 6	2	9600	Chatham.	Chatham	1895	244,046 x	4½	1½–3	5 6-in.Q.F., 6 4·7-in., 8 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	3 (2 sub.)	19·5	550	437
3rd cl. Cr.	Mohawk	S.	1770	225 0	36 0	14 6	2	3500	Glasgow	Thomson	1886	87,583	..	..	6 6-in., 8 3-pr. Q.F., 2 M., 1 l.	1	16·5	475	172
Sloop	Mutine	C.	1130	170 0	36 0	15 9	1	800	Devonp'rt	Maudslay	1880	49,270	..	..	10 5-in., 8 M., 1 l.	..	12·10	150	..
2nd cl. Cr.	Naiad	S.	3400	300 0	43 0	16 6	2	9000	Barrow	Barrow	1890	171,445	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
1st cl. Cr.	Niobe	S.	11,000	435 0	69 0	26 0	2	16,500	Barrow	Barrow	Bldg.	..	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat.	3 (2 sub.)	20·5	1000	600
Sloop	Nymphe	C.	1140	195 0	28 0	12 6	1	2000	Portsm'th	Greenock F'ndry Co.	1888	x 57,600	..	..	8 5-in., 8 M.	..	14·0	100	138
T. G. B.	Niger	S.	810	230 0	27 0	8 9	2	3784	Barrow	Barrow	1892	48,177	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
" "	Onyx	S.	810	230 0	27 0	8 9	2	3548	Birkenh'd	Laird	1892	53,961							
3rd cl. Cr.	Pallas	S.	2575	265 0	41 0	15 6	2	7610	Portsm'th	Hawthorn.	1890	148,828	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	2	19·0	300	217
" "	Pearl	S.	2575	265 0	41 0	15 6	2	7500	Pembroke	Earle	1890	151,693							
1st cl. G. B.	Partridge	C.	755	165 0	30 0	11 4	1	1200	Devonp'rt	Devonport	1888	37,800	..	..	6 4-in., 4 M.	..	13·25	105	76
" "	Peacock	C.	755	165 0	30 0	11 4	1	1200	Pembroke	Barrow Co.	1888	37,600							
Sloop	Pelican	C.	1130	170 0	36 0	15 3	1	800	Devonp'rt	Humphrys	187	56,221	..	..	2 6-in., 6 5-in., 4 M., 1 l.	..	10·6	130	145
3rd cl. Cr.	Pelorus	S.	2135	300 0	36 6	14 0	2	7000	Sheerness	Thomson	1896	..	·22	2	8 4-in. Q.F., 3-pr.	2	20·0	250	200
" "	Proserpine	S.	2135	300 0	36 6	14 0	2	7000	Sheerness	Devonport	Bldg.	..							
Sloop	Penguin	C.	1130	170 0	36 0	16 1	1	700	Glasgow	Hawthorn.	1876	52,111	..	..	2 64-pr. M.L.R., 2 M., 1 l.	..	11·0	150	145

x Includes Gun Mountings, &c.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
2nd cl. Cr.	Phaeton	S.	4300	300 0	46 0	20 6	2	5000	Glasgow	Napier	1883	145,198	..	1½	10 6-in., 4 3-pr. Q.F., 11 M., 2 l.	4	16·6	1000	309
1st cl. G. B.	Pheasant	C.	755	165 0	29 0	11 4	1	1200	Devonp'rt	Devonport	1888	x 37,800	..	..	6 4-in., 4 M.	..	13·25	105	76
3rd cl. Cr.	Philomel	S.	2575	265 0	41 0	15 6	2	7500	Devonp'rt	Earle	1890	156,102	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	2	19·0	300	217
" "	Phœbe	S.	2575	265 0	41 0	15 6	2	7500	Devonp'rt	Devonport	1890	161,154							
Sloop	Phœnix	S. shd.	1050	185 0	32 6	11 3	2	1400	Devonp'rt	Devonport	1895	63,930	·22	..	6 4-in. Q.F., 4 3-pr., 3 M.	..	13·0	160	106
1st cl. G. B.	Pigeon	C.	755	165 0	30 0	11 4	1	1200	Pembroke	Barrow	1888	x 37,800							
" "	Pigmy	C.	755	165 0	30 0	11 4	1	1200	Sheerness	Barrow	1888	37,700	..	..	6 4-in., 4 M.	..	13·25	105	76
" "	Plover	C.	755	165 0	30 0	11 4	1	1200	Pembroke	Barrow	1888	37,700							
2nd cl. Cr.	Pique	S. shd.	3600	300 0	43 8	17 6	2	9000	Jarrow	Palmer	1890	184,108	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	2	19·75	400	273
T. Ram	Polyphemus	S.	2640	240 0	40 0	20 0	2	5500	Chatham	Humphrys	1881	174,450	..	3–2	6 6-pr. Q.F., 2 M.	5	18·0	300	..
3rd cl. Cr.	Porpoise	S.	1770	225 0	36 0	14 6	2	3500	Glasgow	Thomson	1886	87,583	..	..	6 6-in., 8 3-pr. Q.F., 2 M., 1 l.	1	16·5	475	172
1st cl. Cr.	Powerful	S. shd.	14,200	500 0	71 0	27 0	2	25,000	Barrow	Barrow	1895	674,879	6	3–6	2 9·2-in., 12 6-in. Q.F., 16 12-pr., 12 3-pr., 9 M., 2 12-pr. boat	4	22·0	3000	840
3rd cl. Cr.	Pylades	C.	1420	200 0	38 0	15 9	1	1400	Sheerness	Laird	1884	62,000	..	1¼	14 5-in., 8 M., 1 l.	..	12·6	400	170
Sloop	Racer	C.	970	167 0	32 0	14 0	1	850	Devonp'rt	Hawthorn	1884	49,000	..	..	8 5-in., 8 M., 1 l.	..	11·0	150	125
3rd cl. Cr.	Racoon	S.	1770	225 0	36 0	13 6	2	4500	Devonp'rt	Harland	1887	x 91,606	..	..	6 6-in., 8 3-pr. Q.F., 2 M., 1 l.	1	17·5	475	176
2nd cl. Cr.	Rainbow	S. shd.	3600	300 0	43 8	17 6	2	9681	Jarrow	Palmer	1891	184,086	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·7	400	273
" "	Raleigh	I. shd.	5200	298 0	49 0	24 7	1	4200	Chatham	Humphrys	1873	193,386	..	..	8 90-cwt. M.L.R., 8 6-in., 8 5-in., 12 M., 4 l.	..	13·9	550	571
2nd cl. G. Ves.	Rambler	C.	835	157 0	29 6	13 7	1	650	Glasgow	Elder	1880	37,038	..	..	2 20-pr., 1 M., 1 l.	..	10·66	40	160
3rd cl. Cr.	Rapid	C.	1420	200 0	38 0	15 9	1	1400	Devonp'rt	Maudslay	1883	68,226	..	1¼	2 6-in., 10 5-in., 4 M., 1 l.	..	12·6	400	171
1st cl. G. B.	Rattler	C.	715	165 0	29 0	11 0	1	1200	Elswick	Hawthorn	1886	x 38,734	..	..	6 4-in., 4 M.	..	13·6	105	76
T. G. B.	Rattlesnake	S.	550	200 0	23 0	8 0	2	2700	Birkenh'd	Laird	1886	x 35,425	..	..	1 4-in., 6 3-pr. Q.F.	4	18·5	100	67
2nd cl. G. B.	Raven	C.	465	125 0	23 6	10 0	1	360	Poplar	Rennie	1882	21,050	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·5	40	62
1st cl. G. B	Redbreast	C.	805	165 0	31 0	11 7½	1	1200	Pembroke	Earle	1888	38,700	..	..	6 4-in., 4 M.	..	13·0	105	76
" "	Redpole																		
2nd cl. G. B.	Redwing	C.	461	125 0	23 6	10 0	1	360	Pembroke	Maudslay	1880	22,200	..	..	2 20-cwt., 2 M.	..	9·68	40	..
Sloop	Reindeer	C.	970	167 0	32 0	14 0	1	850	Devonp'rt	Hawthorn	1883	87,621	..	..	6 5-in., 8 M., 1 l.	..	11·5	150	..
T. G. B.	Renard	S.	810	230 0	27 0	8 9	2	3500	Birkenh'd	Laird	1892	53,848	4½	..	2 4·7 in. Q.F., 4 3-pr.	3	19·25	100	91
2nd cl. Cr.	Retribution	S. shd.	3600	300 0	43 8	17 6	2	9000	Jarrow	Palmer	1891	183,975	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	275
3rd cl. Cr.	Ringarooma (Australia)	S.	2575	265 0	41 0	15 6	2	7500	Glasgow	Thomson	1890	128,076	4½	2–1	8 4·7-in. Q.F., 8 3-pr. Q.F., 4 M., 1 l.	2	19·0	300	216
1st cl. G. B.	Ringdove	C.	805	165 0	31 5	11 7½	1	1200	Devonp'rt	Devonport	1889	39,753	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
1st cl. Cr.	Royal Arthur	S. shd.	7700	360 0	60 0	23 9	2	12,000	Portsm'th	Maudslay	1891	402,414	6	5–1	1 22-ton B.L.R., 12 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	567
3rd cl. Cr.	Royalist	C.	1420	200 0	38 0	15 9	1	1400	Devonp'rt	Maudslay	1883	68,173	..	1¼	2 6-in., 10 5-in., 4 M., 1 l.	..	12·6	400	171
" "	Ruby	C.	2120	220 0	40 0	18 8	1	1800	Hull	Earle	1876	93,116	..	..	12 64-pr. M.L.R., 6 M., 1 l.	..	12·28	260	236

x Includes Gun Mountings, &c.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
1st cl. Cr.	St. George	S. shd.	7700	360 0	60 8	23 9	2	12,000	Hull	Maudslay	1892	377,204	6	5–1	2 22-ton, 10 6-in. Q.F. 12 6-pr., 5 3-pr., 7 M. 2 l.	4 (2 sub.)	19·7	850	559
T. G. B.	Salamander	S.	735	230 0	27 0	8 3	2	3500	Chatham	Maudslay	1889	57,911	4½	..	2 4·7-in. Q.F., 4 3-pr. Q.F.	1	20·0	100	91
" "	Sandfly	S	525	200 0	23 0	8 9	2	2700	Devonp'rt	Maudslay	1887	x 36,167	·22	..	1 4-in., 6 3-pr. Q.F.	2	19·0	80	67
2nd cl. Cr.	Sappho	S.	3400	300 0	43 0	16 6	2	9861	Poplar	Penn	1891	171,853	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M. 1 l.	4	20·47	400	..
3rd cl. Cr.	Satellite	C.	1420	200 0	38 0	15 9	1	1400	Sheerness	Humphrys	1881	62,900	..	1¼	2 6-in., 6 5-in., 4M., 1 l.	..	12·6	400	167
" "	Scout	S.	1580	220 0	34 0	14 6	2	3200	Glasgow	Thomson	1885	x 87,516	..	..	4 5-in., 8 3-pr. Q.F., 2 M., 1 l.	3 (1 sub.)	16·7	450	147
2nd cl. Cr.	Scylla	S.	3400	300 0	43 0	16 6	2	9280	Poplar	Penn	1892	171,593	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·62	400	273
T. G. B.	Seagull	S.	735	230 0	27 0	8 3	2	3500	Chatham	Maudslay	1889	56,922							
" "	Sharpshooter	S.	735	230 0	27 0	8 3	2	3500	Devonp'rt	Bellis	1888	x 50,029							
" "	Sheldrake	S.	735	230 0	27 0	8 3	2	3500	Chatham	Maudslay	1889	57,800							
" "	Skipjack	S.	735	230 0	27 0	8 3	2	3500	Chatham	Laird	1889	59,531	4½	..	2 4·7-in., 4 3-pr. Q.F.	1	20·0	100	91
" "	Spanker	S.	735	230 0	27 0	8 3	2	3500	Devonp'rt	Bellis	1889	50,000							
" "	Speedwell	S.	735	230 0	27 0	8 3	2	3500	Devonp'rt	Laird	1889	52,000							
2nd cl. Cr.	Severn	S.	4050	300 0	46 0	19 6	2	6000	Chatham	Humphrys	1885	x 212,621	4	3–2	2 15-ton, 10 6-in. Q.F., 3 6-pr., 2 3-pr., 10 M., 2 l.	..	17·3	900	327
" "	Sirius	S. shd.	3600	300 0	43 8	17 6	2	9000	Elswick	Maudslay	1890	186,649							
" "	Spartan	S. shd.	3600	300 0	43 8	17 6	2	9000	Elswick	Maudslay	1891	186,351	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
1st cl. G. B.	Sparrow	C.	805	165 0	31 0	11 7½	1	1200	Greenock	Greenock	1889	39,000	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
T. G. B.	Speedy	S.	810	230 0	27 0	8 9	2	4703	Chiswick	Thornycrft	1893	58,927	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	20·21	100	91
" "	Spider	S.	525	200 0	23 0	8 9	2	2700	Devonp'rt	Maudslay	1887	x 36,300	22	..	1 4-in., 6 3-pr. Q.F.	4	19·0	80	67
2nd cl. G. B.	Starling	C.	465	125 0	23 6	10 0	1	360	Poplar	Rennie	1882	21,100	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·5	40	61
" "	Stork	C.	465	125 0	23 6	10 0	1	360	Poplar	Rennie	1882	21,150	..	..	1 M., 2 l.	..	9·5	40	..
D. V.	Surprise	S.	1650	250 0	32 6	14 0	2	3000	Jarrow	Palmer	1885	x 78,764	..	..	4 5-in., 4 6-pr. Q.F., 2 M.	..	17·0	400	..
Sloop	Swallow	C.	1130	195 0	28 0	11 6	2	1570	Sheerness	Rennie	1885	59,797	..	..	8 5-in., 8 M.	..	13·5	280	135
2nd cl. G. V.	Swift	C.	756	165 0	29 0	10 11	2	870	Blackwall	Rennie	1879	34,670	..	..	2 90-cwt. M.L.R., 4 6-pr. Q.F., 2 M.	..	11·81	180	92
2nd cl. Cr.	Sybille	S.	3100	300 0	42 0	16 6	2	9496	Stephen-son.	Hawthorn.	1890	174,670	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
" "	Talbot	S. shd.	5600	350 0	53 6	21 0	2	9600	Devonp'rt	Devonport	1895	273,856	4½	1½–3	5 6-in. Q.F., 6 4·7-in., 8 12-pr., 1 3-pr., 4 M., 1 l.	3 (2 sub.)	19·5	550	433
3rd cl. Cr.	Tartar	S.	1770	225 0	36 0	14 3½	2	3500	Glasgow	Thomson	1886	x 87,583	..	..	6 6-in., 8 3-pr. Q.F., 2 M., 1 l.	1	16·5	325	177
" "	Tauranga. (Austral'a)	S.	2575	265 0	41 0	15 6	2	7500	Glasgow	Thomson	1889	128,101	4½	2–1	8 4·7-in. Q.F., 8 3-pr. Q.F., 4 M., 1 l.	2	19·0	300	212
2nd cl. Cr.	Terpsichore	S.	3400	300 0	43 0	16 6	2	9000	Glasgow	Thomson	1890	173,341	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr.	4	20·0	400	275
1st cl. Cr.	Terrible	S. shd.	14,200	500 0	71 0	27 0	2	25,000	Glasgow	Thomson	1895	681,419	6	3–6	2 9·2-in., 12 6-in. Q.F., 16 12-pr., 12 3-pr., 9 M., 2 12-pr. boat.	4	22·0	3000	840

x Includes Gun Mountings, &c.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.						£	in.	in.			knots.	tons.	
2nd cl. Cr.	Thames	S.	4050	300 0	46 0	19 6	2	5700	Pembroke	Penn	1885	205,452	4	3–2	2 15-ton, 10 6-in., 3 6-pr. Q.F., 8 3-pr., 6 M., 2 l	..	16·8	900	326
1st cl. Cr.	Theseus	S.	7350	360 0	60 0	23 9	2	12,000	Blackwall	Maudslay	1892	347,577	6	5–1	2 22-ton, 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	544
2nd cl. Cr.	Thetis	S.	3400	300 0	43 0	16 6	2	9000	Glasgow	Thomson	1890	173,146	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
” ”	Tribune	S.	3400	300 0	43 0	16 6	2	9000	Glasgow	Thomson	1891	173,006							
1st cl. G. B.	Thrush	C.	805	165 0	31 0	11 7½	1	1200	Greenock	Greenock F'ndry Co.	1889	39,000	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13 0	105	76
Sloop	Torch	S. shd.	960	180 0	32 6	11 6	1	1400	Sheerness	Sheerness	1894	60,564	..	..	6 4-in. 25-pr. Q.F., 4 3-pr., 2 M.	..	13·25	130	..
3rd cl. Cr.	Tourmaline	C.	2120	220 0	40 0	18 8	1	1800	Middl'sbro	Hawthorn	1875	95,760	..	..	4 6-in., 8 5-in. 38-cwt., 8 M., 2 l.	..	12·2	280	236
2nd cl. Cr.	Venus	S. shd.	5600	350 0	54 0	21 2	2	9600	Glasgow	Elder	Bldg.	249,938	4½	2½	5 6-in. Q.F., 6 4·7-in., 8 12-pr., 7 3-pr., 4 M., 1 12-pr. boat	3 (2 sub.)	19·5	550	450
T. V.	Vesuvius	I.	245	90 0	22 0	8 6	2	350	Pembroke	Maudslay	1874	17,987	..	..	Nil	4	19·71	25	24
2nd cl. Cr.	Vindictive	S.	5800	320 0	54 0	..	2	10,000	Chatham	Maudslay	Bldg.	..	4½	1–2 N.S.	4 6-in. Q.F., 6 4·7-in., 8 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·5	500	450
2nd cl. Cr.	Volage	I. shd.	3080	270 0	42 0	22 0	1	2100	Blackwall	Ravenhill	1874	132,817	..	..	10 6-in., 2 64-pr. M.L.R., 10 M., 2 l.	..	12·8	420	339
T. D. S.	Vulcan	S.	6620	350 0	58 0	23 0	2	12,032	Portsm'th	Humphrys	1889	370,447	4½	5–2½	8 4·7-in. Q.F., 12 3-pr., 16 M., 1 l.	6 (2 sub.)	20·0	1000	433
3rd cl. Cr.	Wallaroo (Australia)	S.	2575	265 0	41 0	15 6	2	7500	Elswick	Hawthorn	1889	115,995	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	2	19·0	300	218
1st cl. G. B.	Widgeon	C.	805	165 0	30 0	11 7½	1	1200	Pembroke	Rennie	1889	39,315	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
Sloop	Wild Swan	C.	1130	170 0	36 0	15 10	1	800	Glasgow	Hawthorn	1876	51,496	..	..	2 6-in., 6 5-in., 2 3-pr. Q.F., 2 M., 1 l.	..	11·35	150	..
2nd cl. G. B.	Wrangler	C.	465	125 0	23 6	10 6	1	360	Barrow	Barrow	1880	22,727	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·88	40	61
1st cl. Cr.	.. ..	S.	11,000	435	69 0	26 0	2	16,500	Pembroke	..	Pro.	..	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat.	..	20·5	1000	600
” ”	.. ..	S.	11,000	435	69 0	26 0	2	16,500	Contract	..	Pro.	..							
” ”	.. ..	S.	11,000	435	69 0	26 0	2	16,500	Contract	..	Pro.	..							
” ”	.. ..	S.	11,000	435	69 0	26 0	2	16,500	Contract	..	Pro.	..							
2nd cl. Cr.	.. ..	S.	5600	350	54 0	21 0	2	9600	Contract	..	Pro.	..	4½	1½–3	5 6-in. Q.F., 6 4·7-in., 8 12-pr., 1 3-pr., 4 M., 1 l.	19·5	..	550	437
” ”	.. ..	S.	5600	350	54 0	21 0	2	9300	Contract	..	Pro.	..							
” ”	.. ..	S.	5600	350	54 0	21 0	2	9600	Contract	..	Pro.	..							
3rd cl. Cr.	.. ..	S.	2135	300	36 6	14 0	2	7000	Sheerness	..	Pro.	..	122	2–1	8 4-in. Q.F., 8 3-pr.	..	20·0	250	200
” ”	.. ..	S.	2135	300	36 6	14 0	2	7000	Hull	Earle	Pro.	..							
” ”	.. ..	S.	2135	300	36 6	14 0	2	7000	Hull	Earle	Pro.	..							
” ”	.. ..	S.	2135	300	36 6	14 0	2	7000	Jarrow	Palmer	Pro.	..							
” ”	.. ..	S.	2135	300	36 6	14 0	2	7000	Jarrow	Palmer	Pro.	..							
” ”	.. ..	S.	2135	300	36 6	14 0	2	7000	Elswick	..	Pro.	..							

x Includes Gun Mountings, &c.

Paddle Wheel Vessels.—Adventure, Alecto, Cockatrice, Dove, Herald, Mosquito, Pioneer, Research (surveying vessel), Sphinx, Triton (surveying vessel).
Twin Screw Gun Boats (Iron).—Doe, Don, Esk, Medina, Medway, Sabrina, Slaney, Spey, Tay, Tees, Trent, Tweed, 373 tons; 320 to 410 I.H.P.
Twin Screw Iron or Steel Gun Boats (Staunch Type).—Ant, Arrow, Badger, Blazer, Bloodhound, Bonnetta, Bouncer, Bulldog, Bustard, Comet, Cuckoo, Fidget, Gadfly, Griper, Hyena, Insolent, Kite, Mastiff, Pickle, Pike, Pincher, Plucky, Scourge, Snake, Snap, Staunch, Tickler, Weasel, 180 to 254 tons; 130 to 270 I.H.P.

Royal Naval Reserved Merchant Cruisers.

	Name.	Owners.	Length.	Breadth.	Maximum Draught of Water for the Admiralty List.	Gross Tonnage.	Indicated Horse-Power.	Ocean Speed.
			Feet.	Feet.	Feet.	Tons.		Knots.
Ships in receipt of an Annual subvention and permitted to fly the blue ensign.	Campania	Cunard Company	610	65	26	12,950	30,000	21
	Lucania	" "	610	65	26	12,950	30,000	21
	Etruria	" "	501½	57	26	8,120	14,500	19½
	Umbria	" "	501½	57	26	8,128	14,500	19½
	Himalaya	Peninsular and Oriental Co.	465½	52	22½	6,898	10,000	17
	Australia	" " "	465½	52	22½	6,901	10,000	17
	Victoria	" " "	466	52	22½	6,091	7,000	16
	Arcadia	" " "	466	52	22½	6,188	7,000	16
	Majestic . 2 s.	White Star Company	565	58	24½	9,965	16,000	20
	Teutonic . 2 s.	" "	565	58	24½	9,984	16,000	20
	Empress of India . 2 s.	Canadian Pacific Railway Co.	440	51	24½	5,905	10,000	16
	Empress of China . 2 s.	" " "	440	51	24½	5,905	10,000	16
	Empress of Japan . 2 s.	" " "	440	51	24½	5,905	10,000	16
Ships held at the disposition of the Admiralty without subsidy.	Servia	Cunard Company	515	52	26	7,392	10,000	16½
	Gallia	" "	430	44½	24	4,809	5,300	15½
	Aurania	" "	470	57	27	7,269	9,500	17
	Britannic	White Star Company	455	45	25	5,004	5,200	16
	Germanic	" "	455	45	25	5,008	5,200	16
	Adriatic	" "	437	40½	23	3,888	3,600	15
	Britannia	Peninsular and Oriental Co.	466	52	22½	6,061	7,000	16
	Oceana	" " "	466	52	22½	6,188	6,000	16
	Peninsular	" " "	410½	48	..	5,000	4,972	15
	Oriental	" " "	410½	48	..	5,000	4,972	15
	Valetta	" " "	420½	45	22½	4,904	5,000	15
	Massilia	" " "	420½	45	22½	4,902	5,000	15
	Rome	" " "	430	44½	22½	5,545	5,500	15
	Carthage	" " "	430	44½	22½	4,879	5,000	15
	Ballarat	" " "	420	43	22½	4,748	4,500	14
	Parramatta	" " "	420	43	22½	4,756	4,500	14

There are also numerous ships on the Admiralty List complying with Admiralty conditions as to subdivision which have no national tie. They are suitable for receiving an armament, but there is no arrangement with Owners, except the promise of preference for occasional State employment.

GREAT BRITAIN, COLONIES, &c.—Cruising Ships, Gunboats, &c.

To what Government belonging.	Class of Ship.	Name.	Material of Construction.	Propellers.	Where Built.	When Launched.	Length.	Breadth.	Draught of Water.	Displacement.	Indicated Horse-Power.	Speed.	Coal Stowage.	Armament.
							ft. in.	ft. in.	ft. in.				tons.	
INDIA	T. G.B.	Assaye	Steel	2	Elswick	1891	230 0	27 0	8 3	735	3,500	19·0	100	2 4·7-in. Q.F., 4 3-pr. do., 1 f. tu. & 2 l. car.
INDIA	D. V.	Lawrence	Steel	Pad.	B'kenh'd	1886	212 2	32 2	18 3	1,154	1,277	13·5	270	Four 4-inch B.L.R., 4 6-pr. Q.F., 4 M.
INDIA	T. G. B.	Plassy	Steel	2	Elswick	1890	230 0	27 0	8 3	735	3,500	19·0	100	2 4·7-in. Q.F., 4 3-pr. do., 1 f. tu. & 2 l. car.
VICTORIA.	Gunboat	Albert	Steel	2	..	1883	115 0	25 0	10 0	350	400	10·0	..	One 8-in. 12-ton; 1 6-in. 4-ton; 2 9-pr.; 2 1-in. Nordenfelts.
VICTORIA.	Gunboat	Victoria	Steel	2	..	1883	140 0	27 0	11 0	530	800	12·0	..	One 8-in. 12-ton; 1 6-in.; 2 12½-pr.; 2 1-in. Nordenfelts.
QUE'NSLAND.	Gun-vessel	Gayundah	Steel	2	Glasgow	1884	115 0	25 0	10 0	450	400	10·0	..	One 8-in. 11½-ton; one 6-in. 4-ton; one 3-pr. Q.F.; 2 M.
QUE'NSLAND.	Gun-vessel	Paluma	Steel	2	Glasgow	1884	115 0	25 0	10 0	450	340	10·0	..	One 8-in. 11½-ton; one 6-in. 4-ton; one 3-pr. Q.F.; 2 M.
SOUTH AUSTRALIA	Cruiser	Protector	Steel	2	..	1884	188 0	3 0	12 6	920	1,640	14·0	..	One 8-in. 11½-ton; five 6-in. 4-ton; five Gatlings.

Victoria has also four Iron Gunboats (Batman, Fawkner, Gannet, Lady Loch) of 336 to 387 tons displacement, and 350 to 500 Ind. H.P., and each armed with one 6-in. 4-ton gun and two machine guns.

Queensland has also a Steel Gunboat, Otter, of 290 tons displacement, and 460 Ind. H.P., armed with one 64-pr. M.L.R.

(The five special second-class Cruisers, and the two Torpedo-Gunboats of the Sharpshooter class for Australia, are included in the alphabetical list of Ships of the Royal Navy, as well as the armour-clads, Abyssinia, Cerberus, and Magdala.)

ARGENTINE REPUBLIC.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed	Normal Coal Supply.	Complement.
												Belt.	Battery. or Turret.	Deck Plating.	Guns.	Torpedo Tubes.			
			metric tons.	ft. in.	ft. in.	ft. in.						inches.	inches.	inches.			knots.	tons.	
c.b.	Almirante Brown	S.	4200	240 0	50 0	20 6	2	4500	Poplar	1880	..	9 (cp.)	8 (cp.)	1½	8 8-in., 6 4·7-in. Q.F., 2 3-pr., 6 M.	2	13·75	650	350
c.d.s.t.	Andes	I.	1535	186 0	44 0	9 6	2	750	Birkenhead	1875	..	6	9	1	2 11-in., 2 4·7-in., 4 M.	..	9·5	120	120
c.d.s.t.	Plata	I.	1535	186 0	44 0	9 6	2	750	Birkenhead	1874	..								
c.d.s.b.	Independencia	S.	2300	230 0	44 4	13 0	2	3000	Birkenhead	1891	..	8 (cp.)	8 (cp.)	2	2 9·4-in. (Krupp), 4 4·7-in. Q.F., 4 3-pr. 4 M.	2	14·4	340	225
c.d.s.b.	Libertad	S.	2300	230 0	44 4	13 0	2	3000	Birkenhead	1890	..								
a.c.	San Martin (ex José Garibaldi)(*a*)	S.	6840	328 0	59 3	24 0	2	13,000	Sestri Ponente	1895	Purchased	6 H.S.	6 H.S.	1½	2 9·6-in., 10 6-in. Q.F., 6 4·7, 10 2.2, & smaller Q.F.	5	20·0	1000*b*	450

(*a*) Purchased from Italy. The Varese, sister ship to the San Martin, is also reported to have been purchased from Italy. (*b*) In addition to liquid fuel.

ARGENTINE REPUBLIC.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.					inches.	inches.			knots.	tons.	
g.v.	Argentina	S.	820	192	0	27	0	13	0	1	850	Trieste	1883	..	..	..	1 6-in., 6 7-c.m. Krupp, 4 M.	..	12·0	220	120
to.g.b.	Aurora	S.	500	203	5	19	8	14	0	2	2300	Elswick	1892	..	..	..	2 4·7 Q.F., 4 1·8-in.	3	18·0	..	..
cr.	Buenos Aires	S. shd.	4740	396	0	47	2	19	0	2	14,000	Elswick	1895	..	4½	1–5	2 8-in. Q.F., 4 6-in. Q.F., 6 4·7-in. Q.F., 16 3-pr., 8 1-pr.	5	23 2	1000	390
to.g.b.	Espora	S.	520	210	0	25	0	8	0	2	3250	Birkenhead	1890	..	..	..	3 3-in. Q.F., 4 3-pr., 2 M.	5	20·0	100	100
cr.	Nueve de Julio	S.	3570	354	0	44	0	19	6	2	14,350	Elswick	1892	..	4½	4½	4 6-in. Q.F., 8 4·7-in., 12 3-pr., 12 1-pr.	5	22·74	770	300
cr.	Patagonia	S. & W.	1530	220	0	32	10	12	9	2	2100	Trieste	1885	..	..	1½	1 10-in., 3 6-in., 6 l., 10 M.	..	14·0	350	140
to.g.b.	Patria	S.	1070	250	0	31	0	10	0	2	4500	Birkenhead	1893	..	..	..	2 4·7-in. Q.F., 4 8-pr., 2 3-pr., 2 M.	5	20·75	288	100
g.v.	Paraná	I.	550	142	8	25	0	11	9	1	475	Birkenhead	1874	..	..	..	2 6-in., 2 4·7-in.	..	11·0	..	..
cr.	25 de Mayo	S.	3200	325	0	43	0	16	0	2	13,800	Elswick	1890	..	4½	4½	2 8·2-in., 8 4·7-in. Q.F., 12 3-pr., 12 1-pr.	3	22·43	600	185
g.v.	Uruguay	I.	550	142	8	25	0	11	9	1	475	Birkenhead	1874	..	..	..	2 6-in., 2 4·7-in.	..	11·0	..	..

AUSTRIA-HUNGARY.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Position. Gun	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.					£	inches.	inches.	inches.			knots.	tons.	
c.d.s.	Budapest (ex C)	S.	5550	305 0	55 9	21 0	2	8500	Trieste	Bldg.	339,062	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9 Q.F., 14 47-m.m. Q.F., 2 M.	4	17·0	500	..
c.b.	Custoza*	I.	7060	302 3	58 0	24 6	1	4440	Trieste	1872	414,400	9	7	1½	8 10·2-in. (Krupp), 11 Q.F., 8 l.	2	14·0	584	567
a.c.	"D"	S.	6100	367 6	56 0	20 4		12,000	Trieste	Bldg.	368,124	10·6 H.S.	9·8 H.S.	1½ H.S.	2 9·4-in., 8 5·9 Q.F., 18 smaller.	4	20·0	800	450
c.b.	Don Juan de Austria	I.	3550	240 3	50 0	20 0	1	2700	Trieste	1875	..	8	6	1	8 8·2-in. (Krupp), 11 Q.F. & M., 6 l.	4	13·0	380	440
c.d.s.	Erzherzog Albrecht*	I.	5940	285 2	56 3	22 0	1	3600	Trieste	1872	357,600	9	7	1½	8 9·4 in. (Krupp), 11 Q.F., 8 l.	2	13·0	453	535
c.b.	Kaiser*	W.	5810	254 0	58 3	21 3	1	3200	Pola	1871	337,200	6	5½		10 9-in. (Armstrong) M.L.R., 11 Q.F. & M., 1.	..	13·0	450	540
a.c.	Kaiserin Maria Theresia	S.	5270	351 0	52 6	21 4	2	9755	Trieste	1893	304,187	4	4	2	2 9·4-in., 8 5·9 Q.F., 18 1·8 Q.F., 2 2·7-in. steel bronze, 2 M.	4	19·0	740	450
c.b.	Kaiser Max	I.	3566	240 3	50 0	20 0	1	2700	Trieste	1875	211,600	8	6	1	8 8·2-in. (Krupp), 11 Q.F. & M., 6 l.	4	13·0	380	440
Riv. Mon.	Körös	S.	448	177 0	29 6	4 0	2	1250	Buda Pesth	1892	..	2	3	¾	2 4·7-in. (Krupp), 2 Q.F., 1 M.		10·0	..	..
b.	Kronprinz Rudolph	S.	6940	295 0	62 4	25 3	2	7500	Pola	1887	330,000	12	10	2½	3 12-in. (Krupp), 6 4·7-in. Q.F., 11 smaller & M., 2 l.	4	16·0	600	492
b.	Kronprinzessin Stefanie	S.	5150	278 10	55 9	21 6	2	8300	Trieste	1887	300,000	9	8	1	2 12-in. (Krupp), 6 5·9-in., 11 Q.F. & M., 2 l.	4	17·0	400	510
Riv. Mon. "	Leitha, Maros	I. & S.	310	166 0	27 6	3 7	2	320	Buda Pesth	1871	20,000	1·7	2	1	1 4 7-in. Q.F., 2 M.	..	8·0	20	54
c.d.s.	Monarch (ex A)	S.	5550	305 0	55 9	21 0	2	8500	Pola	1895	339,062	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9 Q.F., 14 47-m.m. Q.F., 2 M.	4	17·0	500	..
c.b.	Prinz Eugen	I.	3566	240 6	50 0	20 0	1	2700	Pola	1877	..	8	6	1	8 8·2-in (Krupp), 11 Q.F. & M., 6 l.	4	13·0	380	440
Riv. Mon.	Szamos	S.	448	177 0	29 6	4 0	2	1250	Buda Pesth	1892	..	2	3	¾	2 4·7-in. Q.F., 2 Q.F., 1 M.	..	10·0		
c.b.	Tegetthoff*	I. & S.	7390	286 11	71 1	24 10	2	8300	Trieste	1878	..	14	14	3	6 9·4-in. (Krupp), 5 5·9 in. Q.F., 15 smaller do., 2 M.	4	16·3	670	578
c.d.s.	Wien (ex B)	S.	5550	305 0	55 9	21 0	2	8,500	Trieste	1895	339,062	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9 Q.F., 14 47-m.m. Q.F., 2 M.	4	17·0	500	..

* Reconstructed.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			net tns.	ft. in.	ft. in.	ft. in.					£	in.	in.			knots.	tons.	
corv.	Aurora	C.	1370	190 6	32 10	16 1	1	1000	Trieste	1873	..	..	..	2 4 7-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11·0	160	200
to. g. b.	Blitz	S.	360	193 6	22 4	8 0	..	2900	Elbing	1888	..	..	..	9 Q.F.	..	21·0	250	61
cr. 3rd cl.	Donau	C.	2344	230 0	42 8	19 8	1	1800	Pola	1893	..	..	..	10 4·7-in. (Uchatius), 4 M., 1 l.	..	12·0	320	..
cr. 3rd cl.	Erzherzog Friedrich	W.	1590	173 10	39 5	16 9	1	800	Venice	1874	..	..	..	10 5·9-in. (Wahrendorf), 1 l.	..	9·0	200	261
cr. 3rd cl.	Fasana	C.	2000	223 3	39 5	16 9	1	1700	Trieste	1870	..	..	..	4 5·9-in. (Krupp), 2 Q.F., 1 l.	..	12·0	315	260
cr.	Frundsberg	C.	1370	190 6	32 10	16 1	1	1000	Trieste	1873	..	..	..	2 5·9-in. (Wahrendorf), 5 l., 2 M or Q.F.	..	11·0	160	209
to. cr.	Grief Ersatz	..	2000	..	..	..	..	..	..	Bdg	145,312	..	..	(?)	..	..	..	..
cr. 2nd cl.	Kaiserin Elizabeth	S.	4064	321 6	47 6	18 7	2	9000	Pola	1890	..	3·5	2¼	2 9·4-in. (Krupp), 6 5·9-in. do., 11 Q.F., 2 l.	5	19·0	660	450
cr. 2nd cl.	Kaiser Franz Joseph	S.	4030	321 6	47 6	18 7	2	9000	Trieste	1889	..	3·5	2¼	2 9·4-in. (Krupp), 6 5·9-in. do., 11 Q.F., 2 l.	5	19·0	660	450
to. g. b.	Komet	S.	360	193 6	22 4	8 0	..	2900	Elbing	1888	..	..	..	9 Q.F.	..	21·0	..	61
cr. 2nd cl.	Laudon	C.	3430	253 0	46 0	20 8	1	2600	Trieste	1873	..	..	..	15 5·9-in. (Krupp), 7 Q.F. & M., 2 l.	..	13·0	450	497
cr. 3rd cl.	Leopard	S.	1582	224 0	34 0	14 0	2	6000	Elswick	1886	200,000	..	..	2 4·7-in. Q.F., 10 Q.F. & M.	4	18·3	250	148
to. g. b.	Lussin	S.	1011	200 4	26 3	12 2	2	1830	Trieste	1883	..	..	1½	2 5·9-in. (Krupp), 7 M., 1 l.	..	14·0	200	142
to. g. b.	Meteor	S.	350	187 0	22 4	8 0	2	3500	Elbing	1887	..	..	..	9 Q.F.	1	21·0	120	61
cr. 3rd cl.	Panther	S.	1582	224 0	34 0	14 0	2	6000	Elswick	1885	..	..	..	2 4·7-in. Q.F., 10 Q.F. & M.	4	18·5	250	148
to. deps.	Pelikan	S.	2470	279 0	39 4	15 6	..	4600	Elbing	1891	..	..	..	2 5·9-in. (Krupp), 8 Q.F.	4	18·0	..	..
to. g. b.	Planet	S.	500	210 0	23 0	8 3	2	3500	Jarrow	1889	..	..	..	10 Q.F.	1	19·6	..	61
cr. 2nd cl.	Radetzky	C.	3450	253 0	46 0	20 8	1	2700	Trieste	1872	..	..	..	15 5·9-in. (Krupp), 7 Q.F. & M., 2 l.	..	14·0	450	497
cr. 3rd cl.	Saida	C.	2500	233 4	42 8	19 1	1	1800	Pola	1878	..	..	..	11 5·9-in. (Uchatius), 1 l.	..	12·0	320	299
to. g. b.	Satellit	S.	540	220 6	26 9	9 2	2	4000	..	1893	..	..	..	9 Q.F.	..	21·87	..	61
to. g. b.	Sebenico	S.	900	187 0	26 3	12 2	2	1380	Pola	1882	..	..	1½	7 Q.F., 5 l.	..	14·0	200	142
cr. 3rd cl.	Spalato	S.	850	179 6	26 3	12 2	2	1200	Trieste	1879	..	..	..	7 Q.F., 5 l.	..	14·0	150	142
to. cr.	Tiger	S.	1681	233 0	32 10	15 5	2	5260	Trieste	1887	..	..	..	4 4·7-in., 10 Q.F.	..	18·0	300	190
to. g. b.	Trabant	S.	530	210 0	23 0	8 3	2	3500	Trieste	1890	..	..	..	10 Q.F.	1	20·0	..	61
to. v.	Zara (Schoolship)	S.	850	179 6	26 3	12 2	2	1200	Pola	1879	..	..	..	7 Q.F., 5 l.	..	14·0	150	142
corv.	Zrinyi	C.	1370	190 6	32 10	16 1	1	1000	Trieste	1871	..	..	..	2 5·9-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11·0	160	209
to. g. b.	"X"	S.	510	219 10	26 10	8 0	..	5700	..	Bdg	51,052	..	..	6 1·8-in. Q.F.	..	..	..	..

Two screw gunboats, the Grille and Sansego, of about 380 tons displacement and 300 indicated horse-power.

BRAZIL.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
t. River	Alagoãs	W.	340	120 0	28 0	4 10	2	180	Brazil	1886	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth), 2 M.	..	7·0	..	43
c.d.s., t.	Bahia	I.	1000	178 0	35 0	8 6	2	1640	Birkenhead	1865	..	4½	5½	10⅝	2 7-in. M.L.R. (Whitworth), 2 M.	..	6·0	..	125
t. River	Maranhao	S.	470	137 0	34 7	6 5	2	700	Brazil	..	..	5 H.S.	..	..	2 4.7-in. Q.F.	..	12·0	..	..
t.	Two new ships	S.	3162	267 6	47 0	13 2	2	3400	La Seyne	Pro†	..	..	..	..	4 9·4-in., 2 5·9-in. howitzers, 4 4·7-in. Q.F., 2 12-pr., 4 6-pr. and 2 1-pr.	..	14·0	..	..
t. River	Pernambuco	S.	470	137 0	34 7	6 5	2	700	Brazil	..	..	5 H.S.	..	..	2 4·7-in. Q.F.	..	12·0	..	..
t. River	Piauhy	W.	340	120 0	28 0	4 10	2	180	Brazil	1887	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth)	..	7·0	..	43
t.	Riachuelo‡	S. shd.	5700	305 0	52 0	19 6	2	7300	Poplar	1883	365,000*	11 comp.	11 & 10 comp.	10 2″	4 9·2-in. (Whitworth, altered by Armstrong), 6 4·7-in., Q.F., 2 3-pr., 15 M.	5	16·71	800	450
t. River	Rio Grande	W.	340	120 0	28 0	4 10	2	180	Brazil	1888	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth)	..	7·0	..	43
t.	24 de Maio‡ (ex Aquidaban)	S. shd.	4950	280 0	52 0	18 0	2	6200	Poplar	1885	345,000*	11	11½ & 10 cp.	10 2″	4 9·4-in. (Canet), 4 5 5-in., 2 Q.F., 13 M.	5	15·0	600	350

* Exclusive of guns and ammunition. † Particulars doubtful. ‡ Reconstructed.

BRAZIL.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Posit'on.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes	Speed.	Normal Coal Supply.	Comp'ement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					inches.	inches.			knots.	tons.	
cr.	Almirante Tamandare.	S. shd.	4735	294	0	46	0	18	4	2	7500	Brazil	1890	..	..	1½	10 6-in. Q.F., 2 4·7-in., 8 M.	8	17·0	750	450
"	Andrada (ex Britannia)	..	2600	252	8	34	0	18	0	1	3600	..	1890	..	..	..	2 4·7-in. (Armstrong), 2 14-pr. Q.F., 6 6-pr., 6 1-pr.	5	17·0	..	..
to.g.b.	Aurora	S. shd.	480	196	0	21	0	7	9	2	2300	Elswick	1893	..	..	..	2 20-pr. Q.F., 4 3-in.	3	18·0	150	97
cr.	Benjamin Constant	S. shd.	2750	236	0	46	0	18	0	1	2800	La Seyne	1892	..	..	2	4 6-in. Q.F., 8 4·7-in., 8 M., 4 l.	4	14·0	260	287
to.g.b.	Gustavo Sampaio	S.W.	500	197	0	21	0	7	9	2	2500	—	1893	..	..	..	2 20-pr. Q.F., 4 7-pr. Q.F.	3	18·0	150	95
..	New cruiser	S.	3800	320	0	44	0	18	0	2	7000	Elswick	Bldg.	..	4½	1–3	6 6-in. Q.F., 4 4·7-in., 10 smaller	3	20·0	800	300
..	Nictheroy (ex El Cid)	C.	7080	400	0	48	0	22	0	..	40,000	New York	1893	..	..	..	1 14·9-in. (Dynamite), 1 4·7-in. Q.F., 2 3·9-in., 8 6-pr., 10 3-pr.	3	19·0	..	..
"	Parnahyba (Torpedo training.)	C.	838	170	6	26	3	11	2	1	900	Havre	1878	..	..	..	5 4·7-in. (Armstrong), 4 M.	..	10·0	..	..
"	Paysandu (ex Guanabára)	W.	1900	200	0	41	2	16	4	1	3000	Brazil	1877	..	..	..	9 70-pr. M.L.R. (Whitworth), 6 M., 2 l.	..	13·0	..	250
cr.	Primeiro de Março	C.	726	167	3	26	3	10	6	1	750	Brazil	1881	..	..	...	7 4·5-in. M.L.R. (Whitworth), 4 M.	..	9·0	..	..
"	Quinze de Novembro (ex Republica)	S.	1300	210	0	35	0	13	0	2	3300	Elswick	1892	..	..	2–1	6 4·7-in. Q.F., 4 6-pr., 6 M.	4	17·0	170	160
g.v.	Tiradentes	S. shd.	800	165	0	30	0	11	0	2	1200	Elswick	1892	..	..	..	4 4·7-in. Q.F., 3 6-pr., 4 M.	2	14·5	110	107
cr.	Tonelero (ex Trajano)	W.	1414	200	0	30	0	15	6	2	2400	Brazil	1873	..	..	..	7 4·7-in. (Armstrong), 4 M.	..	13·0	..	..
"	Trinidade	I.	250	101	8	21	8	10	10	2	280	Brazil	1884	..	..	..	2 l., 1 M.	..	10·0	..	..

CHILI.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.b.	Almirante Cochrane	I.	3500	210 0	45 9	19 8	2	2920	Hull	1874	..	9	8	7¾ 3"	6 8-in. (Armstrong), 4 6-pr. Q.F., 4 3-pr., 7 M.	3	13·0	500	242
b.	Capitano Prat	S. shd.	6900	328 0	60 8	21 10	2	12,000	La Seyne	1890	391,000	12 steel schn.	10½ 4	.. 3"	6 9·4-in. (Canet), 8 4·7-in. Q.F. (Canet), 6 57-mm., 4 47-mm., 10 37-mm., 5 M.	4	18·3	400 1100	485
„	Esmeralda	S.	7000	436 0	53 2	22 0	2	..	Elswick	1896	..	6	5	2	2 8-in. Q.F., 16·6-in., 8 12-pr., 10·6-pr., 4 M.	3	23 0	550 1000	..
t.	Huascar	I.	1800	200 0	35 0	15 6	1	1050	Birkenhead	1865	..	4½	5½	14 1½"	2 8-in. (Armstrong), 2 4·7-in. Q.F., 3 M., 4 l.	..	12·0	250	134

Cruising Ships, &c.

Class	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.			knots.	tons.	
corv.	Abtao	C.	1370	227 0	29 6	15 6	1	1000	New York	1864	..			1 70-pr., 4 6-pr. and 3-pr. Q.F., 4 M.	..	9·0	300	179
to.g.b / to.g.b.	Almirante Condell / Almirante Lynch	S.	750	240 0	27 6	10 6	2	4500	Birkenhead	1890	..	..	..	3 14-pr. Q.F., 4 3-pr., 2 M.	5	21·0	100	..
to.g.b	Almirante Molinas	S.	1200	295 3	32 6	12 10	2	6000	..	Bldg.	..	..	..	4 4·7 Q.F., 6 1·8-in., 4 1 4-in., 2 M.	4	22·0	1200	..
„	Almirante Simpson	S.	750	240 0	27 6	10 6	2	4500	Birkenhead	Bldg.	..	4½	..	2 4·7 Q.F., 4 3-pr.	3	21·0	100	..
cr.	Blanco Encalada	S.	4400	370 0	46 6	18 6	2	14,500	Birkenhead	1893	..		4–1¾	2 8-in., 10 6-in. Q.F., 12 3-pr., 12 1-pr.	5	22·78	900	..
„	Congreso	S. shd.	7500	42 6	54 0	22 0	..	16,000	La Seyne	Bldg.	..	5	4½–1¾ H.S.	4 6-in. (Canet) Q.F., 8 5-in., 14 1·8-in., 12 1·4-in.	3	23·0	1000	..
gr.	Magellanes	C.	800	190 0	28 0	14 9	2	1230	London	1874	..	..	..	2 6-in., 1 7-in. M.L.R., 6 M., 2 l.	..	11·0	300	100
cr.	Ministro Zenteno	..	3150	330 3	43 9	16 1	2	..	..	1896	..	..	..	8 6-in. Q.F., 10 6-pr., 4 1-pr.	3	20·0	..	..
gr.	O'Higgins	W.	1470	218 6	33 4	17 4	1	1200	London	1866	..	..	..	2 70-pr., 2 12-pr., 4 M.	..	10·0	200	163
„	Pilcomayo	W.	790	171 0	27 4	..	1	180 (nom.)	Birkenhead	1874	..	..	..	2 70-pr. B.L.R. (Armstrong), 2 40-pr., 3 M.	..	9·0	125	125
cr. / „	Presidente Errázuriz / Presidente Pinto	S. shd.	2080	268 0	35 9	19 6	2	5400	La Seyne	1890	..	..	3½	4 6-in. Q.F. (Canet), 2 5-in., 4 2·2-in., 6 M.	3	19·0	200	171

Five Gunboats of 420 tons displacement and 7 to 10 knots speed.

CHINA.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches			knots.	tons.	
cr.	Foo-Ching . . .	S.	2500	253 0	36 2	18 0	2	2400	..	1893	..	4½	4–2	3 5-in. Krupp, 4 M., 2 l. . .	..	16·0	..	..
to g.b.	Feiying	S.	850	..	..	..	2	4500	..	1895	..	..	..	.. .. ..	..	22.0	..	..
"	Hi-Ying . . .	S.	2200	253 0	36 2	18 1	2	2400	..	1895	..	..	..	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1	21·0	..	..
"	Huan-Tái . . .	C.	2110	260 0	36 0	20 0	1	1600	...	1886	..	..	..	3 7-in. Krupp, 7 40-pr., 4 M. .	2	15·0	360	..
"	Kai-Chih . . .	C.	2110	260 0	36 0	20 0	1	1600	..	1882	..	..	..	2 8 2-in., 6 5 9-in, 6 M., 5 l. .	..	15·0	360	..
"	King-Ching . . .	C.	2100	250 0	36 0	20 0	1	2400	..	1886	..	..	..	3 7-in. Krupp, 7 40-pr., 6 M. .	2	14·5	360	..
"	Kwang Ting . .	C.	1000	235 0	27 6	11 4	2	3400	..	1890	..	·22	1	3 4 7-in. Q.F., 4 M., 2 l. .	4	16·5	..	..
"	Nan-Schuin . . .	S.	2200	253 0	36 2	18 1	2	2400	Kiel.	1884	..	..	..	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1	14·5	600	..
"	Nan-Thin . . .	S.	2200	253 0	36 2	18 1	1	2400	Kiel.	1883	..	..	..	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1	15·0	600	..
..	Pao Min . . .	S.	1480	213 0	36 0	14 0	1	2400	..	1883	..	..	..	2 6-in. Armstrong, 6 5-in., 2 1	..	9	300	..
g.b.	Tien Sing . . .	W.	200	105 0	20 4	7 0	2	340	..	1875	..	3	..	1 7-in. (Krupp) . . .	..	10·0	..	..

DENMARK.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Gun Position.	Deck Plating.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.d.s.,t.	Gorm . . .	I.	2344	231	0	40	0	14	0	2	1670	Copenhagen	1870	104,000	7	8	..	2 10-in. (Armstrong) M.L.R., 3 3·4-in. (Krupp), 4 M.	..	12·25	115	158
t.	Helgoland . .	I.	5347	257	6	59	2	18	8	2	4000	Copenhagen	1878	275,000	12	10	1½	1 12-in. (Krupp), 4 10·2-in., 5 4·7-in., 10 M.	4	12·0	230	350
b.	Iver Hvitfeldt .	S.	3260	242	0	49	6	18	0	2	5100	Copenhagen	1886	200,000	12	8	2	2 10·2-in. (Krupp), 4 4·7-in., 12 M.	4	15·6	250	298
c.d.s.,t.	Lindormen. .	I.	2076	216	0	39	5	13	9	2	1560	Copenhagen	1868	93,000	5	5	..	2 9-in. (Armstrong) M.L.R., 3 3·4-in. (Krupp), 4 M.	..	12·0	120	140
c.b.	Odin . . .	I.	3083	237	0	50	0	15	6	1	2260	Copenhagen	1872	147,000	8	8	..	4 10-in. (Armstrong) M.L.R., 4 3·4-in. (Krupp), 7 M.	..	12·4	180	236
t.	Skjold * . . .	S.	2150	226	6	38	0	13	5	..	2200	Copenhagen	Bldg.	..	9	8-4½	2	1 9·4-in., 3 4·7-in. (Krupp), 4 1·8-in. Q.F., 1 M.	4	13·0	..	..
T. S.	Tordenskiold .	S.	2400	221	6	43	3	15	6	2	2600	Copenhagen	1880	138,900	..	8	4-2	1 14-in. (Krupp), 4 4·7-in., 8 M.	4	14·0	170	220

* *Esbern Snare* (torpedo school-ship), 530 tons, 2-in. belt. Repaired 1895-6.

DENMARK.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. ꝏ Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
g. v.	Absalon	I.	527	150	0	26	0	10	2	1	500	Blackwall	1862	..	2½	2½	4 3·4-in. (Krupp), 4 M.	..	10·0	65	70
"	Diana	W.	556	154	6	26	3	10	2	1	500	Copenhagen	1863	33,000	..	..	6 3·4-in. (Krupp), 2 M.	..	9·0	60	81
"	Falster	I.	356	111	0	28	10	7	6	2	510	Copenhagen	1873	33,000	..	..	1 10-in. (Armstrong) M.L.R., 2 3·4-in. (Krupp), 2 M.	..	9·8	20	35
cr.	Fyen	S. shd.	2596	226	6	45	6	18	1	1	2700	Copenhagen	1882	170,000	..	1½	18 5·9-in. (Krupp), 8 M.	2	13·0	290	407
g. v.	Fylla	W.	556	154	0	26	3	10	2	1	500	Copenhagen	1862	33,000	..	..	6 3·4-in. (Krupp), 2 M.	..	9·0	60	81
3rd cl. cr.	Geiser	S.	1280	257	6	27	6	11	4	2	3000	Copenhagen	1892	..	..	1½	2 4·7-in. Q.F., 4 3·4-in., 6 M.	4	17·1	..	..
"	Heimdal	S.	1280	257	6	27	6	11	4	2	3000	Copenhagen	1894	..	..	1½	2 4·7-in. Q.F., 4 3-pr., 6 M.	4	17·5	..	..
"	Hekla	S.	1280	233	0	32	10	11	2	2	3000	Copenhagen	1890	..	..	1½	2 6-in. Q.F., 4 2·2-in., 6 M.	4	17·0	..	..
g. v.	Ingolf	I.	870	192	0	28	0	12	6	1	600	Copenhagen	1876	44,000	..	..	2 5·9-in. (Krupp), 4 3·4-in., 2 M.	..	10·5	130	117
g. v.	Möen	I.	356	111	0	28	10	7	6	1	523	Copenhagen	1875	..	..	..	1 10-in. (Armstrong) M.L.R., 2 3·4-in. (Krupp), 2 M.	..	9·2	20	35
corv.	Saint Thomas	W.	1572	224	0	33	0	17	0	1	1870	Copenhagen	1871	..	..	..	8 4·7-in. (Krupp), 6 M.	..	13·0	190	182
cr.	Valkyrien*	S.	2900	268	0	43	6	18	0	2	5300	Copenhagen	1887	..	..	2½	2 8·2-in. (Krupp), 6 5·9-in., 4 Q.F., 10 M.	5	17·0	450	300

* Repaired 1895–96.

Gunboats.—Five in number (*Lille Belt, Öresund, Store Belt, Gronsund, Guldborgsund*), of 150 to 240 tons, 200 to 400 I.HP. *Dagmar* (training-ship), corvette, 1200 tons; *Hjaelperen* (mining), 280 tons.

FRANCE.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
a.g.b.	Achéron	I. & S.	1640	181	0	40	4	11	10	2	1700	Cherbourg	1885	100,000	8	8	2½	1 10·6 in., 3 3·9-in. Q.F., 2 1·8-in., 4 M.	..	13·0	100	101
b.	Amiral Baudin	I. & S.	11,380	321	6	69	10	26	2	2	8320	Brest	1883	600,000	21½	16½	4	3 14·5-in., 4 6·2-in. Q.F., 8 5·5-in., 9 1·8-in., 14 M.	6	15·0	800	630
a.c.t.	Amiral Charner	S.	4750	348	0	46	0	19	2	2	8300	Rochefort	1893	353,200	3½	2	2	2 7·4-in., 2 5·5-in. Q.F., 4 2·5-in., 6 1·8-in., 6 1·4-in., M.	5	18·2	413	375
b.	Amiral Duperré	I. & S.	10,487	311	0	66	11	26	9	2	8120	La Seyne	1879	570,000	21½	15½	2½	4 13·3-in., 1 6·2-in., 14 5·5-in., 11 Q.F., 18 M.	4	14·22	850	661
t.	Amiral Tréhouart	S.	6610	293	2	58	4	23	2	2	8400	Lorient	1893	593,100	17¾	14½	4	2 12-in., 8 3·9-in. Q.F., 4 1·8-in. Q.F., 4 1·4-in., 8 M.	2	17·0	300	337
a.c.	Bayard	W.	5986	265	9	57	2	24	11	2	4538	Brest	1880	..	10	8	2	4 9·4-in., 2 7·4 in., 6 5·5-in., 2 2·5-in., 12 M.	2	14·0	500	450
t.	Bouvet	S.	12,205	401	2	70	3	27	6	3	14,000	Lorient	Bldg	1,100,770	15¾	14½	3½	2 12-in., 2 10·6-in., 8 5·5-in. Q.F., 8 3·9-in., 12 1·8-in., 20 1·4-in.	4	17·5	621	631
t.	Bouvines	S.	6610	293	9	58	3	23	3	2	8400	La Seyne	1892	594,640	17¾	14½	4	2 12-in., 8 3·9-in. Q.F., 4 1·8-in., 10 1·4-in. M.	2	16·05	300	323
t.	Brennus	S.	11,000	361	0	67	0	26	3	2	14,000	Lorient	1891	991,767	15¾ comp.	15¾	4¾	3 13·3-in., 10 6·2-in. Q.F., 4 2·5-in., 8 1·8-in., 8 M.	4	17·1	800	696
a.c.t.	Bruix	S.	4751	365	3	46	0	19	10	2	8700	Rochefort	1894	409,622	3¾	3¾	2	2 7·5-in., 6 5·5-in. Q.F., 4 2·5-in., 4 1·8-in., 6 1·4-in., M.	4	19·0	406	391
b.	Caïman	I. & S.	7200	278	3	59	0	24	7	2	6000	Toulon	1885	..	19½	17¾	3	2 16·5-in., 4 3·9-in. Q.F., 2 1·8-in., 16 M.	4	14·5	400	332
t.	Carnot	S.	12,008	382	2	70	6	27	3	2	15,000	Toulon	1894	1,070,088	17¾ 10¾	14½	2¾	2 12-in., 2 10·6-in., 8 5·5-in. Q.F., 4 2·5-in., 16 1·8-in., 10 1·4-in.	6	17·5	705	625
a.c.t.	Chanzy	S.	4750	348	0	46	0	19	2	2	8300	Bordeaux	1894	360,000	3¾	2	2	2 7·4-in., 6 5·5-in. Q.F., 4 2·5-in., 6 1·8-in., 6 1·4-in., M.	4	19·0	413	375
b.	Charlemagne	S.	11,275	385	6	66	6	27	6	3	14,500	Brest	1895	1,096,432	15.7	15¾	3½	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1.4-in., 8 M.	4	18·0	680	631
t.	Charles Martel	S.	11,880	392	6	71	0	27	6	2	13,500	Brest	1893	1,092,830	17¾	15¾	3½	2 12-in., 2 10·6-in., 8 5·5-in. Q.F., 4 2·5-in., 12 1·8-in., 2 1.4-in., 8 M.	6	17·5	677	632
a.g.b.	Cocyte	I. & S.	1640	181	10	40	4	11	10	2	1700	Cherbourg	1887	100,000	8	8	2½	1 10·6-in., 2 3·9-in. Q.F., 2 1·8-in., 4 M.	..	13·0	100	101
c.b.	Colbert	W.	8457	317	9	56	6	28	5	1	4652	Brest	1875	..	8½	6¼	..	8 10·6-in., 2 9·4-in., 6 5·5-in., 2 Q.F., 14 M.	4	14·47	700	706
c.b.&b.	Courbet	I. & S.	9652	312	0	67	0	25	0	2	8100	Toulon	1881	800,000	15	9½	2½	4 12·5-in., 4 10·6-in., 6 5·5-in., 2 Q.F., 18 M.	5	15·4	900	669
c.b.&b.	Dévastation	I. & S.	9639	312	0	67	0	25	0	2	8320	Lor ent	1879	..	15	9½	2½	4 12·5-in., 4 10·6-in., 6 5·5-in., 2 Q.F., 18 M.	4	15·17	950	685
a.c.b.	Duguesclin	S. shd.	5894	266	0	57	0	25	3	2	3300	Rochefort	1883	220,000	9	8 comp.	2	4 9·4-in., 1 7·4-in., 6 5·5-in., 1 3·5-in. Q.F., 10 M.	2	14·0	400	430
a.c.	Dupuy de Lôme	S.	6297	374	0	51	6	23	6	3	14,000	Brest	1890	416,000	4	4	2	2 7·4-in., 6 6·2-in. Q.F., 12 2·5-in., 1·8-in., 8 M.	4	20·0	900	515
a.g.b.	Flamme	S.	1046	165	0	32	7	10	4	2	1500	Cherbourg	1885	68,000	10	4-in.	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84
b.	Formidable	S.	11,441	321	6	69	6	26	2	2	9700	Lorient	1885	467,520	21½	17¾	3	3 14·6-in., 4 6·2-in. Q.F., 8 5·5-in., 9 1·8-in., 14 M.	6	16·2	1200	640
c.b. & b.	Friedland	I.	8824	317	0	58	0	29	11	1	4428	Lorient	1873	..	8	7	..	8 10·6-in., 8 5·5-in., 20 M.	4	13·3	800	676
c.d.s., t.	Fulminant	I. & S.	5651	248	0	57	9	21	4	1	4500	Cherbourg	1877	..	13	12	2	2 10·6-in., 4 1·8-in. Q.F., 6 M.	2	13·8	400	248
c.d.s., b.	Furieux	I. & S.	6000	247	10	59	0	21	9	2	5033	Cherbourg	1883	264,610	20	17¾	3½	2 13·3-in., 5 Q.F., 10 M.	2	14·0	290	248
a.g.b.	Fusée	S. shd.	1150	165	0	32	7	10	4	2	1500	Lorient	1884	68,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.					£	inches.	inches.	inches.			knots.	tons.	
b.	Gaulois	S.	11,275	385	6	66	6	27	6	3	11,500	Brest	Bldg.	1,093,925	15¾	15¾	3½–1½	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1·4-in., 8 M.	6	18·0	680	632
a.g.b.	Grenade	S. shd.	1046	165	0	32	7	10	4	2	1500	Lorient	1888	68,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84
c.d.s., t.	Henri IV.*	S.	7000	278	10	65	8	23	0	2	7000	Cherbourg	Pro.	409,622	(?)	(?)	(?)	1 12-in., 10 5·5-in. Q.F., 2 howitzers, 8 1·8-in. Q.F., 2 M.	(?)	15	700	(?)
t. & b.	Hoche	I. & S.	10,650	333	0	65	7	27	3	2	11,300	Lorient	1886	700,000	18	16	3	2 13·3-in., 2 10·6-in., 8 5·5-in., Q.F., 8 Q.F., 12 M.	5	16·0	800	660
b.	Indomptable	I. & S.	7168	279	10	59	0	23	6	2	6605	Lorient	1883	..	20	17½	3	2 16·5-in., 4 3·9-in. Q.F., 2 1·8-in., 16 M.	4	14·8	400	332
t.	Jauréguiberry	S.	11,824	364	0	72	10	27	9	2	14,200	La Seyne	1893	1,069,536	17¾	14½	2¾	2 12-in., 2 10·6-in., 8 5·5-in. Q.F., 4 2·5-in., 12 1·8-in., 8 1·4-in., 8 M.	6	17·5	700	625
a.c.	Jeanne d'Arc	S.	11,270	469	2	63	8	26	7	3	28,000	Toulon	Bldg.	882,955	5·9	(?)	2·2	2 7·6-in., 8 5·5-in. Q.F., 12 3·9-in., 16 1·8-in., 8 1·4-in., 2 M.	2	23	1400	626
c.d.s., t.	Jemmapes	S.	6590	284	0	57	8	22	0	2	9250	St. Nazaire	1892	525,000	17¾–10	17¾	4–2¾	2 13 3-in., 4 3·9-in. Q.F., 4 1·8-in. Q.F., 10 1·4-in. M.	2	16·7	300	334
a.c.	Latouche Tréville	S.	4750	348	0	46	0	19	2	2	8300	Havre	1892	360,000	3⅛	3¾	2–1½	2 7·4-in., 6 5·5-in. Q.F., 4 2·5-in., 4 1·8-in., 6 1·4-in. M.	4	18·2	406	375
b.	Magenta	I. & S.	10,600	330	0	65	7	27	3	2	12,000	Toulon	1890	760,960 (*e*)	18	16	3	4 13·3-in., 17 5·5-in. Q.F., 4 2·5-in., 12 1·8-in., 8 M.	3	16·25	800	660
b.	Marceau	I. & S.	10,581	330	0	65	7	27	3	2	12,000	La Seyne	1887	769,080 (*e*)	18	16	3	4 12·5-in., 17 5·5-in. Q.F., 4 2·5-in. and 12 1·8-in., 8 M.	6	16·4	800	660
t.	Masséna	S.	11,924	384	10	66	0	27	0	3	13,500	St. Nazaire	1895	1,100,400	17¾–9¾	15¼–15¾ H. S.	3½ H. S.	2 12-in., 2 10·6-in., 8 5·5-in. Q.F., 8 3·9-in., 12 1·8-in. and 12 1·4-in.	6	17·5	630	642
a.g.b.	Mitraille	S. shd.	1130	165	0	32	7	10	4	2	1500	Rochefort	1886	70,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	..	13·0	120	84
b.	Neptune	I. & S.	10,630	330	0	65	7	27	3	2	12,000	Brest	1887	780,000	18	16	3	4 12·5-in., 17 5·5-in. Q.F., 4 2·5-in. and 12 1·8-in., 8 M.	5	16·02	800	660
c.d.s.	Onondaga †	I.	2592	226	6	49	3	16	0	2	642	New York	1863	..	5½	11¾	1	4 9·4-in., 4 M.	..	6·5	200	100
a.g.b.	Phlégéton	I. & S.	1790	187	0	40	4	11	10	2	1700	Cherbourg	1890	142,000	9	8	2	1 10·6-in., 1 5·5-in. Q.F., 4 1·8-in., 4 M.	..	12·4	72	101
a.c.t.	Pothuau	S.	5360	370	6	50	2	21	0	2	10,000	Havre	1895	384,000	3⅓–2	9½	3⅜	2 7·4-in., 10 5·5-in. Q.F., 10 1·8-in., 8 1·4-in.	4	19·0	538	461
c.b. & b.	Redoutable	I. & S.	8860	318	2	64	8	25	6	2	6071	Lorient	1876	..	14	9½	2½	8 10·6-in., 6 5·5-in., 2 Q.F., 12 M.	4	14·66	1000	700
b.	Requin	I. & S.	7200	279	10	59	0	24	7	2	6000	Bordeaux	1885	..	19½	17¾	3	2 16·5-in., 4 3·9-in. Q.F., 2 1·8-in., 16 M.	4	15·0	400	332
c.b. & b.	Richelieu	W.	8767	323	6	57	10	27	11	2	4240	Toulon	1873	..	8½	6¼	..	6 10·6-in., 5 9·4-in., 8 5·5-in. 18 M.	4	13·11	900	720
t.	Saint Louis	S.	11,275	385	6	66	6	27	6	3	14,500	Lorient	Bldg.	1,080,997	15¾	3–15¾	3½	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1·4-in., 8 M.	4	18·0	680	631
a.g.b.	Styx	I. & S.	1790	187	0	40	4	11	10	2	1700	Cherbourg	1892	142,000	9	8	2	1 10·6-in., 1 5·5-in. Q.F., 4 1·8-in., 4 M.	..	13·0	72	101
c.b. & b.	Suffren	W.	7782	282	6	57	10	29	10	1	4288	Cherbourg	1870	..	8	6¼	..	1 10·6-in., 4 9·4-in., 6 5·5-in. 3-ton, 12 M.	4	14·3	700	675
c.d.s., t.	Tempête	I. & S.	4869	248	0	57	9	16	9	1	2193	Brest	1876	..	13	12	2	2 10·6-in., 4 1·8-in. Q.F., 6 M.	2	11·7	200	197
b.	Terrible	I. & S.	7713	279	10	59	0	24	7	2	6230	Brest	1881	..	19½	17¾	3	2 16·5-in., 4 3·9-in. Q.F., 2 1·8-in., 16 M.	4	14·5	400	332

* Particulars doubtful.

† Repaired and refitted as central ship of coast defence service at St. Malo.

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.			—		£	inches.	inches.	inches.			knots.	tons.	
c.d.s., b.	Tonnant .	. I.&S.	5100	248	7	58	5	17	3	1	1935	Rochefort	. 1880	..	18	14½	3	2 12·5-in., 4 M.	..	11 5	200	197
c.d.s., t.	Tonnerre .	. I.&S.	5589	248	0	57	9	21	4	1	4165	Toulon	. 1875	..	13	12	2	2 10·6-in., 4 1·8-in. Q.F., 6 M.	2	14·01	400	219
c.b. & b.	Trident .	. W.	8456	317	9	56	4	29	1	1	5083	Toulon	. 1876	..	8½	6¼	..	8 10·6-in., 2 9·4-in., 6 5·5-in. 2 Q.F., 14 M.	6	14·17	650	730
"	Triomphante .	W.	4700	258	2	48	9	22	5	1	2400	Rochefort	. 1877	..	..	4¾	..	6 9·4-in., 1 7·4-in., 6 5·5-in., 8 M.	2	12·89	410	388
a.c.	Turenne .	. W.	6400	265	9	57	2	23	11	2	4160	Lorient	. 1879	..	10	8	2	4 9·4-in., 2 7·4-in., 6 5·5-in., 12 M.	2	14·14	500	450
c.d.s., t.	Valmy .	. S.	6592	293	9	57	4	23	3	2	8954	St. Nazaire	. 1892	578,957	17¾	17¾	4	2 12·5-in., 4 3·9-in. Q.F., 4 1·8-in. 10 M.	2	16·7	300	297
a.c.	Vauban .	. S.	6150	267	9	57	3	24	0	2	4560	Cherbourg	. 1882	..	10	8	2	4 9·4-in., 1 7·4-in., 6 5·5-in., 12 M.	2	14·32	550	440
d.s., t.	Vengeur .	. I.&S.	4700	248	0	57	9	16	9	2	2030	Cherbourg	. 1878	..	13	12	2	2 12·5-in., 4 1·8-in. Q.F., 6 M.	2	10·83	200	107

FRANCE.—Cruising Ships, &c.

Class.	NAME.	Material.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
2nd cl. *cr.*	**Alger**	S.	4122	346 0	45 3	19 6	2	8254	Cherbourg	1889	280,000	..	3½	4 6·2-in. Q.F., 6 5·5-in., 10 other Q.F., 10 M.	4	19·61	860	325
g. v.	**Amiral Parseval**	W. & I.	860	197 6	28 0	12 2	1	918	Rochefort	1879	33,772	..	..	4 5·5-in., 4 M.	..	12·33	150	116
3rd cl. *cr.*	**Amiral Rigault de Genouilly.**	W.	1713	236 3	35 5	17 0	1	2043	Brest	1876	62,796	..	..	8 5·5-in., 8 M.	..	14·49	200	198
2nd cl. *cr.*	**Aréthuse**	W.	3649	277 6	43 6	21 9	1	4200	Toulon	1882	..	..	..	4 6·2-in., 22 5·5-in., 8 M.	..	14·0	500	474
g. v.	**Aspic**	C.	480	145 4	23 10	10 6	1	453	Rochefort	1880	..	..	..	2 5·5-in., 2 3·9-in.	..	10·3	50	80
3rd. cl. *cr.*	**Beautemps-Beaupré**	W.	1246	204 8	34 2	15 10	1	985	Brest	1872	..	..	..	6 5·5-in., 8 M.	..	12·6	250	154
to. g. b.	**Bombe**	S.	395	196 10	21 7	5 11	2	2000	Havre	1885	..	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
2nd. cl. *cr.*	**Bugeaud**	S.	3740	318 5	43 6	20 6	2	9000	Cherbourg	1893	308,650	..	3	6 6·2-in. Q.F., 4 3·9-in., 8 1·8-in., 11 1·4-in.	6	19·25	587	358
g. v.	**Capricorne**	W.	480	148 4	23 10	10 5	1	443	Havre	1882	..	..	..	2 5·5-in., 2 3·9-in.	..	11·18	70	80
to. g. b.	**Casabianca**	S.	960	262 6	26 10	11 6	2	5000	Bordeaux	1895	98,985	..	½	1 3·9-in. Q.F., 3 2·5-in. 5 1·8-in. 4 1·4-in.	..	21·5	116	143
2nd. cl. *cr.*	**Cassard**	S.	3952	325 6	44 11	20 6	2	9500	Cherbourg	1894	318,712	..	2½	6 6·2-in., Q.F., 4 3·9-in., 12 1·8-in., 10 1·4-in.	2	19·5	621	385
to. g. b.	**Cassini**	S.	945	262 6	27 4	11 6	2	5000	Bordeaux	1894	98,500	..	½	1 7-in. Q.F., 3 2·5-in. 4 1·4-in.	2	21·5	110	118
2nd. cl. *cr.*	**Catinat**	S. Shd.	4065	331 10	44 8	21 1	2	9000	Havre	1894	324,992	..	2½	4 6·2-in. Q.F., 10 3·9-in., 10 1·8-in., 4 1·4-in. M.	2	19·0	563	384
1st cl. *cr.*	**Cécille**	I. & S.	5766	378 9	49 3	19 9	2	10,200	La Seyne	1888	299,666	..	4	8 6·2-in. Q.F., 10 5·5-in., 6 1·8-in., 14 M.	4	19·0	940	486
2nd cl. *cr.*	**Chasseloup-Laubat**	S.	3722	308 6	43 6	20 10	2	9000	Cherbourg	1893	256,320	..	3	6 6·2-in. Q.F., 4 3·5-in., 8 1·8-in., 12 1·4-in. M.	6	19·25	587	358

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
1st cl. *cr.*	Châteaurenault	S.	8018	442 10	55 9	24 6	3	23,000	La Seyne	Bldg.	606,656	2	3	2 6·4-in. Q.F., 6 5.5-in., 10 1·8-in.	..	23	1400	625
3rd cl. *cr.*	Coëtlogon	S.	1848	312 0	30 5	14 0	2	5800	St. Nazaire	1889	131,000	..	1½	4 5·5-in. Q.F., 3 other Q.F., 4 M.	5	19·3	200	190
g. v.	Comète	C.	473	151 6	24 9	10 6	1	631	Cherbourg	1884	..	..	..	2 5·5-in., 2 3·9-in., 2 M.	..	12.2	60	84
to. cr.	Condor	S.	1240	216 6	29 3	15 5	2	3800	Rochefort	1885	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	17·7	160	134
3rd. cl. *cr.*	Cosmao	S.	1877	312 0	30 5	14 0	2	6000	Bordeaux	1888	133,000	..	..	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·5	200	190
to. g. b.	Couleuvrine	S.	395	196 10	21 7	5 11	2	2047	Havre	1885	33,778	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
to. g. b.	Dague	S.	395	196 10	21 7	5 11	2	2000	Havre	1885	36,119	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
2nd. cl. *cr.*	D'Assas	S.	3952	325 6	44 11	20 6	2	9500	St. Nazaire	1896	292,682	..	2½	6 6·2-in. Q.F., 4 3 9-in., 10 1·8-in., 11 1·4-in.	2	19·25	614	385
2nd. cl. *cr.*	Davout	S.	3027	297 6	40 0	17 6	2	8881	Toulon	1890	221,827	..	3	6 6·2-in. Q.F., 4 3·9-in., 4 2·5-in., 4 1·8., 6 M.	4	20·07	600	336
1st. cl. *cr.*	D'Entrecasteaux	S.	8114	393 8	58 6	25 9	2	13,500	La Seyne	Bldg.	667,740	2¾	4	2 9·4-in., 12 5·5-in Q.F., 12 1·8-in.	6	19·0	650	521
2nd. cl. *cr.*	Descartes	S. sh.l.	3988	326 0	42 4	21 4	2	8500	St. Nazaire	1894	334,725	..	1½	4 6·2-in. Q.F., 10 3 7-in., 8 1·8-in., 4 1·4-in.	2	19·0	552	386
3rd. cl. *cr.*	D'Estaing	W. & I.	2236	262 5	37 5	18 8	1	3700	Brest	1879	84,718	..	..	15 5·5-in., 8 M.	..	15·31	300	264
to. g. b.	D'Iberville	S.	925	262 6	27 0	11 2	2	5060	St. Nazaire	1893	99,120	..	½	1 3·9-in. Q.F., 1 2·5-in., 4 1·4-in.	6	21·6	117	118
to. g. b.	Dragonne	S.	395	196 10	21 7	5 11	2	2000	Havre	1885	36,074	..	..	4 5·5-in. Q.F., 3 M.	2	18·0	100	63
2nd. cl. *cr.*	Dubourdieu	W.	3566	253 7	46 6	22 10	1	3300	Cherbourg	1884	154,553	..	..	4 6·2-in., 12 5·5-in., 10 M.	2	14·0	600	496
3rd cl. *cr.*	Duchaffault	W.	1289	204 8	34 2	16 0	1	1214	Brest	1872	36,830	..	..	6 5·5-in., 6 M.	..	12·72	250	151
2nd cl. *cr.*	Du Chayla	S. shd.	3952	325 6	44 11	20 6	2	9500	Cherbourg	Bldg.	315,835	..	2½	6 6·4-in. Q.F., 4 3·9-in., 10 1·8-in., 11 1·4-in.	2	19·25	624	385
2nd cl. *cr.*	Duguay Trouin	I. & W.	3661	296 3	43 4	20 6	1	4399	Cherbourg	1877	132,116	..	..	5 6·2-in., 5 5·5-in., 4 1·8-in. Q.F., 5 M.	2	15·9	700	311
g. v.	Dumont d'Urville	W.	825	201 11	28 6	13 8	1	1081	Havre	1878	33,602	..	..	4 5·5-in., 1 3·9-in., 1 2·5-in., 2 M	..	11·6	200	116
to. g. b.	Dunois (ex M 3)	S.	896	256 0	27 10	12 8	2	6400	Cherbourg	Bld.	123,383	..	..	6 2·5-in. Q.F., 6 1·8-in.	..	23	137	128
3rd cl. *cr.*	Dupetit Thouars	W.	1931	257 10	35 9	16 0	1	2018	Brest	1874	58,220	..	..	10 5·5-in, 8 M.	..	15·07	300	200
2nd cl. *cr.*	Duquesne	I. & W.	5824	333 5	50 3	25 6	1	6589	Rochefort	1876	221,570	..	..	7 6·2-in. Q.F., 14 5·5-in., 8 M.	..	16·8	900	550
3rd cl. *cr.*	Éclaireur	I. & W.	1658	236 3	35 5	17 0	1	2050	Toulon	1877*	16,232	..	..	8 5·5-in., 6 M.	..	15·0	200	195
to. cr.	Epervier	S.	1240	216 6	29 3	15 5	2	3200	Rochefort	1885	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	17·6	160	134
g. v.	Étoile	C.	502	149 3	24 7	8 4	2	450	France.	1885	29,782	..	..	6 3·9-in., 1 2·5-in., 2 M.	..	10·0	60	77
3rd cl. *cr.*	Fabert	W.	1927	294 4	36 0	18 4	1	1107	Rochefort	1874	61,967	..	..	8 5·5-in., 4 M.	..	12·42	300	218
to. cr.	Faucon	S.	1240	216 6	29 3	15 5	2	3200	Toulon	1887	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	17·1	150	134
to. g. b.	Flèche	S.	395	196 10	21 7	5 11	2	2000	Havre	1885	37,517	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
3rd cl. *cr.*	Fleurus	S.	1310	229 8	29 2	15 4	2	4000	Cherbourg	1893	128,530	..	..	5 3·9-in. Q.F., 6 1·8-in., 4 M.	..	18·0	118	179
,, ,,	Forbin	S.	1848	312 0	30 5	16 0	2	5700	Rochefort	1888	123,739	..	1½	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·6	200	190
,, ,,	Forfait	W. & I.	2321	249 4	38 0	18 0	1	2764	Toulon	1879	77,019	..	..	15 5·5-in., 8 M.	..	13·44	400	264
cr.	Foudre (torpedo transport)	S.	6090	380 6	51 3	23 5	2	11,500	Bordeaux	1895	407,712	..	3½	8 3·9-in. Q.F., 4 2·5-in., 4 1·8-in.	..	18·50	840	410
2nd cl. *cr.*	Friant	S.	3740	308 6	43 6	20 10	2	9500	Brest	1893	308,750	..	3	6 6·2-in. Q.F., 4 3·9-in. 8 1·8-in. 12 1·4-in.	6	18·19	587	358
g. v.	Fulton	W.	811	199 5	28 5	12 8	1	850	Lorient	1887	37,000	..	..	2 5·5-in., 1 3·9-in., 5 M.	..	13·0	160	116
,, ,,	Gabès	C.	490	151 6	24 9	10 6	1	450	Rochefort	1884	28,624	..	..	2 5·5-in., 2 3·9-in.	..	11·0	60	84
3rd cl. *cr.*	Galilée	S.	2317	330 2	34 6	17 10	2	6400	Rochefort	Bldg.	208,152	..	1½	4 6·4-in. Q.F., 10 3·9-in., 10 1·8-in., 4 1·4-in.	2	20·0	226	248

* New machinery, 1895.

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Compl.ment.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
1st cl. cr.	Guichen	S.	8277	436 4	54 10	24 7	3	24,000	St. Nazaire	Bldg	611,945	..	3	2 6·4-in. Q.F., 6 5·5-in., 10 1·8-in.	..	23·0	1460	625
g. v.	Hussard	W.	825	201 10	28 6	13 7	1	850	Havre	1875	33,822	..	..	4 5·5-in., 2 M.	..	12·08	200	116
d. v.	Inconstant	W.	811	199 5	28 5	12 7	1	850	La Seyne	1886	37,000	..	..	2 5·5-in., 1 3·9-in., 5 M.	..	13·0	160	116
2nd cl. cr.	Iphigénie (Training ship)	W.	3346	244 6	46 6	22 4	1	2800	..	1881	115,323	..	..	6 6·2-in., 2 3·5-in., 10 M.	1	14·6	400	391
" "	Isly	S.	4160	346 0	43 6	19 6	2	8100	Brest	1891	252,760	..	3	4 6·2-in. Q.F., 6 5·5-in., 14 2·5-in. and 1·8-in., 8 M.	5	18·3	880	332
2nd cl. cr.	Jean Bart	S.	4160	346 0	43 6	19 6	2	8000	Rochefort	1889	283,240	..	4	4 6·2-in. Q.F., 6 5·5-in., 14 2·5-in., and 1·8-in., 8 M.	5	19·0	940	332
g. v.	Kersaint	S. shd.	1243	226 0	31 5	15 0	1	2200	Rochefort	Bldg.	107,933	..	..	1 5·5-in. Q.F., 5 3·9-in., 7 1·4-in.	..	15·0	199	110
to. g. b.	La Hire (ex M 4)	S.	896	256 0	27 10	12 9	2	6400	Cherbourg	Bldg.	123,383	..	..	6 2·5-in. Q.F., 6 1·8-in.	..	23·0	137	128
3rd cl. cr.	Lalande	S.	1877	311 6	31 2	14 0	2	6000	Bordeaux	1888	133,800	..	1½	6 5·5-in. Q.F., 8 other Q.F., 4 M.	5	22·0	200	190
to. g. b.	Lance	S.	395	196 10	21 7	5 11	2	2000	Havre	1886	39,964	..	..	4 1·8-in., Q.F., 3 M.	2	18·0	100	63
3rd cl. cr.	Lapérouse	W. & I.	2319	262 5	37 5	18 8	1	2280	Brest	1877	85,347	..	..	15 5·5-in., 8 M.	..	14·73	300	264
" "	Lavoisier	S.	2317	330 2	34 6	17 10	2	6400	Rochefort	B.dg.	202,024	..	1½	4 5·5-in. Q.F., 2 3·9-in., 8 1·8-in., 6 1·4-in.	2	20·0	226	248
to. g. b.	Léger	S.	450	197 0	23 0	10 6	2	2360	Lorient	1891	52,000	..	..	1 3·9-in. Q.F., 3 2·5-in., 4 1·4-in.	3	18·8	130	69
" "	Lévrier	S.	450	197 0	23 0	10 6	2	2210	Lorient	1891	52,000	..	..	1 3·9-in. Q.F., 3 2·5-in., 4 1·4-in.	3	18·5	130	69
3rd cl. cr.	Linois	S.	2345	321 6	34 6	17 5	2	6600	La Seyne	1894	163,014	3·9	1½	4 5·5-in. Q.F., 2 3·9 in., 8 1·8-in., 4 1·4-in., 4 M.	4	20·5	200	248
g. v.	Lion	C.	473	151 6	24 9	10 6	1	576	Havre	1884	23,146	..	..	2 5·5-in., 4 M.	..	11·8	70	84
" "	Lutin	C.	474	141 9	23 11	9 4	1	373	Cherbourg	1877	20,295	..	..	2 5·5-in., 2 3·9-in.	..	10·0	60	77
" "	Lynx	C.	474	141 9	23 11	9 4	1	427	Cherbourg	1878	21,478	..	..	2 5·5-in., 2 3·9-in.	..	10·38	60	77
3rd cl. cr.	Magon	W. & I.	2294	249 4	38 0	18 0	1	2462	Cherbourg	1881	85,112	..	..	15 5·5-in., 8 M.	..	14·17	350	264
g. v.	Météore	C.	473	151 6	24 9	10 6	1	434	Cherbourg	1886	26,262	..	..	2 5·5-in., 3 M.	..	10·0	70	77
to. g. b.	M. 1	S.	375	..	..	..	2	..	..	Pro.	66,602	..	..	1 2·5-in. Q.F., 7 1·8-in.	1	26·0	..	60
3rd cl. cr.	Milan	S.	1550	303 2	32 10	14 7	2	3986	St. Nazaire	1886	89,058	..	..	5 3·9-in. Q.F., 8 M.	2	18·1	400	186
2nd cl. cr.	Naiade	I. shd.	3525	246 0	47 2	22 10	1	2700	Toulon	1881	128,275	..	..	2 6·2-in., 18 5·5-in., 10 M.	..	13·68	500	490
3rd cl. cr.	Nielly	W. & I.	2257	262 5	37 5	18 8	1	2921	Brest	1880	81,037	..	..	15 5·5-in., 8 M.	..	15·23	300	264
g. v.	Papin	W. & I.	811	199 6	28 6	13 7	1	855	La Seyne	1886	37,000	..	..	2 5·5-in., 1 3·9-in., 5 M.	..	13·0	160	116
2nd cl. cr.	Pascal	S.	3988	326 0	42 4	21 4	2	8500	Toulon	1895	322,321	..	1½	4 6·4-in Q.F., 10 3·9 in., 8 1·8-in., 4 1·4-in. M.	2	19·0	650	378
3rd cl. cr.	Primauguet	W. & I.	2270	262 5	37 5	18 8	1	2268	Rochefort	1882	108,592	..	..	15 5·5-in., 8 M.	..	14·50	200	264
2nd cl. cr.	Protet (ex E 4)	S.	4113	331 10	44 8	21 1	2	9000	Bordeaux	Bldg.	324,992	..	2	4 6·2-in. Q.F., 10 3·9-in., 10 1·8-in., 4 1·4-in. M.	2	19·0	563	384
3rd cl. cr.	Roland	W.	2819	249 4	38 0	17 7	1	2294	Cherbourg	1882	84,184	..	..	15 5·5-in., 8 M.	..	14·50	350	264
g. v.	Sagittaire	W. & I.	450	148 4	23 10	10 5	1	518	Havre	1881	18,185	..	..	2 5·5-in., 2 3·9-in.	..	11·05	70	80
to. g. b.	Sainte Barbe	S.	395	196 10	21 7	5 11	2	2000	Rouen	1885	43,233	..	1½	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
" "	Salve	S.	395	196 10	21 7	5 11	2	2000	Rouen	1886	42,538	..	1½	4 1·8-in. Q.F., 3 M.	2	18·0	100	63

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
g. v.	Scorpion	C.	473	151 6	24 9	10 6	1	511	Havre	1883	23,459	..	..	2 5·5-in., 3 M.	..	11·0	70	84
2nd cl. *cr.*	Sfax	S.& W.	4502	288 9	49 3	24 9	2	6522	Brest	1884	200,000	..	1½	6 6·2-in. Q.F., 10 5·5-in., 10 M.	5	16·84	1000	473
2nd cl. *cr.*	Suchet	S.	3430	318 3	43 6	17 6	2	9000	Toulon	1893	226,360	..	3	4 6·2-in. Q.F., 4 3·9-in., 4 1·8-in., 12 1·4-in., 6 M.	7	20·0	480	246
3rd cl. *cr.*	Surcouf	S.	1848	312 0	30 5	14 0	2	6000	Cherbourg	1888	131,200	..	1½	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·5	200	190
g. v.	Surprise	S.	629	184 8	24 7	12 3	1	900	Havre	1895	50,951	..	..	2 3·9-in. Q.F., 4 2·5-in., 4 1·4-in.	..	13·0	73	99
1st cl. *cr.*	Tage	S. shd.	7345	390 0	53 8	22 10	2	12,410	St. Nazaire	1886	93,857	..	..	8 6·2-in., 10 5·5-in., 2 2·5-in., 6 Q.F., 14 M.	7	19·0	1000	400
2nd cl. *cr.*	Tourville*	I. & W.	5743	333 5	50 3	25 4	1	7466	La Seyne	1876	271,499	..	..	7 6·2-in. Q.F., 14 5·5-in., 8 M.	..	16·89	800	550
3rd cl. *cr.*	Troude	S.	1877	311 6	31 2	14 0	2	6000	Bordeaux	1888	33,383	..	1½	4 5·5-in. Q.F., 8 other do., 4 M.	5	20·9	200	190
transpt. dsp.	Vaucluse †	W.	1613	209 10	34 5	16 0	1	800	Rochefort	Bldg.	83,056	..	..	4 5·5-in., 2 3·5-in., 4 1·4 M.	..	10 6	..	114
3rd cl. *cr.*	Vautour	S.	1280	216 6	29 3	15 5	2	3391	Toulon	1886	87,733	..	1½	5 3·9-in. Q.F., 1 2·5-in. do., 6 M.	5	17·3	150	134
3rd cl. *cr.*	Villars	W. & I.	2419	249 4	38 0	17 7	1	2960	Cherbourg	1879	80,000	..	..	15 5·5-in., 8 M.	..	14·25	350	264
g. v.	Vipère	C.	463	145 4	23 10	10 6	1	441	Rochefort	1881	26,835	..	..	2 5·5-in., 2 3·9-in.	..	10·3	60	80
"	Voltigeur	W. & I.	851	199 5	28 5	12 7	1	999	Brest	1878	23,077	..	..	4 5·5-in., 4 M.	..	12·48	150	116
3rd cl. *cr.*	Wattignies	S.	1310	230 0	29 3	15 0	2	4189	Rochefort	1891	111,000	..	..	5 3·9-in. Q.F., 6 1·8-in., 7 1·4-in., M.	4	18·61	160	180

* New engines, 1893.

† Work suspended in 1895, proposed to be resumed in 1899 and completed in 1900.

GERMANY.—Armoured Ships.

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Mean Draught.		Propellers.	Indicated Horse-power.	Where built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Gun Position	Deck Plating	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	ins.	ins.	ins.			knots.	tons.	
c. d. s. b.	Aegir	S.	3600	240	0	49	3	17	9	2	4800	Kiel	1895	233,500	9½ H.S.	8 H.S.	3	3 9·4-in., 10 3·4-in. Q.F. 6 M.	4	16·0	225	255
2nd. cl. b.	Baden*	I.	7441	321	6	60	0	15	8	2	4917	Kiel	1880 1896	444,886	16	10	3	6 10·2-in., 6 3·4-in. Q.F., 1 l., 8 M.	5	14·0	700	376
a. g. b.	Basilisk	I.	1109	154	3	36	0	10	2	2	759	Bremen	1878	58,042	8	8	2	1 12-in., 2 3·3-in., , 2 M.	2	9·0	40	76
2nd. cl. b	Bayern*	I.	7441	321	6	60	0	19	8	2	4917	Kiel	1878 1896	406,660	16	10	3	6 10·2-in., 6 3·4-in. Q.F., 1 l., 8 M.	5	14·0	700	376
c. d. s. b.	Beowulf	S.	3500	259	2	49	3	17	9	2	4800	Bremen	1890	175,000	9½	8	1	3 9·4-in., 8 3·4-in. Q.F., 6 M.	4	16·0	225	266
1st. cl. b.	Brandenburg	S.	10,100	354	4	65	0	24	7	2	9640	Wilhelmshaven	1891	606,500	15¾ comp.	11¾ comp.	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 8 M., 2 l.	7	16·5	750	552
a. g. b.	Biene	I.	1109	154	3	36	0	10	2	2	759	Bremen	1876	62,853								
a. g. b.	Camäleon	I.	1109	154	3	36	0	10	2	2	759	Bremen	1878	57,564	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
”	Crocodil	I.	1109	154	3	36	0	10	2	2	759	Bremen	1879	57,237								
2nd. cl. c. b.	Deutschland	I.	7319	280	0	62	4	24	7	1	5360	Poplar	1874	412,022	10	8	2	8 10·2-in., 1 5·9-in., 6 4-in., 9 3·4-in. Q.F., 12 M., 2 l.	5	14·5	710	668

* Receiving new machinery, a fighting mast with two tops, and part new armament.

GERMANY.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
3rd. cl. *t.*	**Friedrich der Grosse**	I.	6770	307 0	53 6	24 7	1	5400	Kiel	1874	365,170	9½	8 br. 10 tur.	..	4 10·2-in., 2 6·6-in., 10 3 4-in. Q.F., 8 M., 2 l.	4	14·0	550	537
1st. cl. *b.*	**Friedrich der Grosse** (Ersatz)	S.	..	..	..	..	..	..	..	Pro.	700,000	..	..	..	.. ..	..	..	..	..
c. d. s. b.	**Frithjof**	S.	3500	240 0	49 3	17 9	2	4800	Bremen	1891	175,000								
c. d. s. b.	**Hagen**	S.	3500	240 0	49 3	17 9	2	4516	Kiel	1893	..	9½ H. S.	7¾ H. S.	3	3 9·4-in., 8 3·4-in. Q.F., 6 M.	4	16·0	225	266
c. d. s. b.	**Heimdall**	S.	3500	240 0	49 3	17 9	2	4393	Wilhelmshaven	1892	233,500								
c. d. s. b.	**Hildebrand**	S.	3500	240 0	49 3	17 9	2	4413	Kiel	1892	218,000								
a. g. b.	**Hummel**	I.	1109	143 0	36 0	10 2	2	759	Bremen	1881	56,741	8	8	2	1 12-in., 2 3 3-in., 2 M.	2	10·0	40	76
2nd cl. *c. b.*	**Kaiser**	I.	7531	292 0	62 4	24 7	1	5700	Poplar	1874	411,301	10	10	2	8 10·2-in., 1 5·9-in., 6 4-in., 9 3·4-in. Q.F., 2 M., 2 l.	5	14·6	710	668
3rd cl. *br.*	**König Wilhelm***	I.	9757	355 0	60 0	26 7	1	8350	Blackwall	1868 1896	505,141	12	6	..	20 9·4-in., 1 5·9-in., 18 3 4-in. Q.F., 8 M. 4 l.	5	14·7	700	759
1st. cl. *b.*	**Kurfürst Friedrich Wilhelm.**	S.	10,100	354 4	65 0	24 7	2	9959	Wilhelmshaven	1891	653,000	15¾ comp.	11¾ comp.	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 8 M., 2 l.	7	15·0	750	552
a. c.	**Leipzig** (Ersatz)	S. shd.	10,300	385 9	65 8	26 0	3	13,000	Kiel	Bld.	..	7¾ H. S.	7¾ H. S.	3	4 9·4-in., 12 5·9-in. Q.F., 10 3·4-in., 10 1·4-in., 8 M.	5	19.0	..	..
a. g. b.	**Mücke**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1877	60,960	8	8	2	1 12-in., 2 3 3-in., 2 M.	2	10·0	40	76
a. g. b.	**Natter**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1880	52,822	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
c. d. s. b.	**Odin**	S.	3600	240 0	49 3	17 9	2	5000	Danzig	1894	..	9½ H. S.	7¾ H. S.	3	3 9·4 in., 10 3·4-in. Q.F., 6 M.	4	16·0	225	266
2nd cl. *b.*	**Oldenburg**	S.	5200	246 0	59 0	19 6	2	3900	Stettin	1884	235,342	13 comp.	8 comp.	1	8 9·4-in. (Krupp), 2 3·4-in. Q.F., 6 M.	4	13·5	475	356
3rd cl. *t.*	**Preussen**	I.	6770	308 6	53 6	24 7	1	4383	Stettin	1873	351,904	9	8 10	..	4 10·2-in.(Krupp), 2 6·6-in., 10 3·4-in. Q.F., 6 M., 2 l.	4	14·0	550	537
t	**Preussen** (Ersatz)	S.	11,000	377 4	67 0	25 8	3	13,000	Wilhelmshaven	B'dg.	706,000	11¾ H. S.	9¾ H. S.	3	4 9·4-in., 18 5·9-in. Q.F., 12 3·3-in., 24 1·9-in., 12 M.	6	18·0	750	590
2nd cl. *b.*	**Sachsen†**	I.	7441	321 6	60 0	19 8	2	4917	Stettin	1877 1896	422,178	15¾	10	3	6 10·2-in. (Krupp), 6 3·4-in. Q.F., 1 l., 8 M.	5	14·0	700	376
c. d. s. b.	**Siegfried**	S.	3500	240 0	49 3	17 9	2	4800	Kiel (Germania)	1889	175,000	9½	7¾	3	3 9·4-in., 6 3·4-in. Q.F., 6 M.	4	15·0	225	266
a. g. b.	**Salamander**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1880	56,914								
"	**Skorpion**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1877	60,796	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
"	**Viper**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1876	61,463								
"	**Wespe**	I.	1109	154 3	36 0	10 2	2	759	Bremen	1876	53,771								
1st cl. *b.*	**Weissenburg**	S.	10,100	354 4	65 0	24 7	2	9000	Wilhelmshaven	1891	659,475								
"	**Wörth**	S.	10,100	354 4	65 0	24 7	2	10,224	Kiel	1892	595,250	15¾	11¾	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 8 M., 2 l.	7	17·2	750	552
2nd cl. *b.*	**Württemberg †**	I.	7441	321 6	60 0	19 8	2	4917	Stettin	1878 1896	402,512	15¾	10	3	6 10·2-in. (Krupp), 6 3·4-in. Q.F., 1 l., 8 M.	5	14·0	700	376

* Under reconstruction at Hamburg; to receive 5·9-in. Q.F. guns in lieu of the 9·4 breechloaders, and a steel deck.

† To receive new machinery, a fighting mast with two tops, and part new armament.

The Arminius, Friedrich Carl, and Kronprinz are now used for harbour service.

GERMANY —Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
3rd cl. *cr.*	Alexandrine	I. S. & W.	2373	236 3	42 7	18 4	1	2400	Kiel	1885	102,877	..	..	10 5·9-in., 4 4·1-in., 10 M., 1 l.	1	14 0	..	267
" "	Arcona	I. S. & W.	2373	236 3	42 7	18 4	1	2400	Danzig	1885	109,875	..	..	10 5·9-in., 4 4·1-in., 10 M., 1 l.	1	14·0	..	267
" "	Blitz	S.	1382	246 0	32 10	13 5	2	2839	Kiel	1882	66,935	..	..	6 3·4-in., 4 M.	1	16·0	250	127
cr.	Blücher	I. & W.	2856	244 4	44 10	19 8	1	2990	Kiel	1877	136,408	..	..	2 5·9-in., 6 M.	7	14·0	400	206
g. b.	Bremse	S.	866	203 5	27 10	10 6	1	1500	Bremen	1884	49,308	..	2½	1 8·2-in.	..	15·0	65	73
g. b.	Brummer	S.	866	203 5	27 10	10 6	1	1500	Bremen	1884	52,422	..	2½	1 8·2-in.	..	15·0	65	73
3rd cl. *cr.*	Bussard	S.	1857	256 0	30 2	18 4	2	2900	Danzig	1890	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·5	400	..
3rd cl. *cr.*	Carola*	I. & W.	2169	226 4	42 7	18 4	1	2100	Stettin	1880	109,617	..	..	6 5·9-in., 2 4·1-in. Q.F., 8 3·4-in.	..	14·0	250	267
" "	Falke	S. & W.	1731	246 0	33 6	15 0	2	2900	Kiel	1891	..	..	3	8 4·1-in. Q.F., 7 M.	2	15·5	400	..
" "	Freya	C.	2017	259 2	35 0	17 4	1	2471	Danzig	1874	106,868	..	..	8 5·9-in., 10 M.	..	15 0	..	..
2nd cl. *cr.*	Freya (Ersatz) "K" & "L"	S.	† 5650	314 5	57 0	21 6	3	10,000	Danzig, Bremen & Stettin	Bldg.	..	4 H.S.	4	2 8 2-in., 8 5·9-in. Q.F., 10 3 4-in., 10 1·4-in., 4 M.	3	21	500†	
" "	"M" & "N"	S.	..	..	..	..	..	..	..	Pro.	375,000	..	..	.. ..				
2nd cl. *cr.*	Gefion	S.	4207	344 6	48 8	..	2	9000	Elbing, (Schichau)	1893	..	..	3	8 5·9-in., 10 4·1-in. Q.F., 6 1·9-in., 1 l., 2 M.	2	20·0	950	312
3rd cl. *cr.*	Geier	S. & W. shd.	1640	246 0	33 6	15 0	2	2930	Wilhelmshaven	1894	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·0	400	..
3rd cl. *cr.*	Greif	S.	2000	318 0	32 0	13 0	2	5400	Kiel	1886	..	..	..	2 3·4-in. Q.F., 4 M.	..	23·0	..	130
4th cl. *cr.*	"G"	S.	..	..	..	..	..	..	..	Pro.	130,000	..	..	.. ..	..	..	..	155
g. v.	Habicht	I. & W.	848	174 0	29 6	11 5	1	600	Elbing	1879	33,054	..	..	5 4·9-in., 5 M.	..	12·0	..	128
g. b.	Hyäne	I.	489	139 8	25 1	9 10	1	340	Wilhelmshaven	1878	24,310	..	..	1 4·9-in., 1 3·4 in., 4 M.	..	9·0	..	83
d. v.	Hela ("H")	S.	2000	328 0	36 0	..	2	6,000	Bremen	1895	..	..	..	4 4·1-in. Q.F., 5 1·9-in.	..	23	..	..
g. b.	Iltis	I.	489	139 8	25 1	9 10	1	340	Danzig	1878	27,480	..	..	1 4·9-in., 1 3·4-in., 4 M.	..	9·0	..	83
2nd cl. *cr.*	Irene	S.	4100	339 6	46 0	21 0	2	8000	Stettin	1887	220,000	..	3	4 5·9-in., 8 4·1-in. Q.F., 6 1 9-in., 1 l., 8 M.	4	19·8	900	358
3rd cl. *cr.*	Jagd	S.	1250	275 6	31 6	13 9	2	4000	..	1888	..	..	2	4 3 4-in. Q.F., 2 M.	3	20 0	..	126
1st cl. *cr.*	Kaiserin Augusta	S.	6331	393 0	49 3	23 0	3	14,000	Kiel (Germania)	1892	..	..	3½	12 5·9-in., 8 3·4-in. Q.F., 2 l., 8 M.	5	22·5	..	427
to. g. b.	Komet	S.	946	262 6	31 2	13 9	2	5000	Stettin	1892	..	..	2	4 3·4-in. Q.F., 2 M.	1	20·0	..	90
3rd cl. *cr.*	Kondor	S. & W.	1640	246 0	33 6	15 0	2	2930	Hamburg	1892	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·5	400	..
3rd cl. *cr.*	Kormoran	S. & W.	1640	246 0	33 6	15 0	2	2930	Danzig	1892	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·0	400	..
3rd cl. *cr.*	Marie	I. & W.	2100	226 4	42 7	18 4	1	2100	Hamburg	1881	..	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 l., 6 M.	..	13·5	..	267
d. v.	Meteor	S.	946	262 6	29 6	11 6	2	4500	Gaarden	1890	..	..	2	2 3·4-in. Q.F., 2 M.	3	21·0	..	90
3rd cl. *cr.*	Nixe‡	I. & W.	1760	177 2	42 8	18 0	1	700	Danzig	1885	..	..	..	8 5·9-in.	..	10 5	..	116
3rd cl. *cr.*	Olga	I. & W.	2100	226 4	42 7	18 4	1	2100	Stettin	1880	113,812	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 l., 6 M.	..	14·0	..	267
3rd cl. *cr.*	Pfeil	S.	1382	246 0	32 10	13 5	2	2700	Wilhelmshaven	1882	73,605	..	..	4 3·4-in. Q.F., 4 M.	1	16·0	250	127
2nd cl. *cr.*	Prinzess Wilhelm	S.	4400	339 6	46 0	21 0	2	8000	Gaarden	1887	220,000	..	3	4 5·9-in., 8 4·1-in. Q.F., 6 1·9-in., 1 l., 8 M.	4	18·7	900	358
4th cl. *cr.*	Schwalbe	S. & W.	1120	203 0	30 6	12 4	2	1500	Wilhelmshaven	1887	..	..	3	8 4·1-in. Krupp, 7 M.	..	13·5	300	150
3rd cl. *cr.*	Seeadler	S. & W.	1640	246 0	33 6	15 0	2	2800	Hamburg	1892	..	..	3	8 4·1-in., 7 M.	2	16·0	400	156
3rd cl. *cr.*	Sophie	I. & W.	2100	226 4	42 7	18 4	1	2100	Danzig	1892	117,155	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 l., 6 M.	..	14·0	..	267

* Gunnery ship for quick-firing guns.

† Displacement with 950 tons of coal 6100 tons.

‡ Training Ship.

GERMANY.—Cruising Ships—*continued*.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
												Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			tons.	ft. in.	ft. in.	ft. in.	no.				£		in.			knots	tons.	
4th cl. *cr.*	Sperber	S. & W.	1120	236 0	29 8	12 6	2	1500	Wilhelmshaven	1888	..	..	3	8 4·1-in., 6 M.	..	13·5	300	150
3rd cl. *cr.*	Wacht	S.	1250	275 6	31 6	13 9	2	4000	Bremen	1887	..	..	2	4 3·4-in. Q.F., 2 M.	3	19·6	..	126
g. b.	Wolf	I.	480	139 8	25 1	9 10	1	340	Wilhelmshaven	1878	24,343	..	..	1 4·9-in., 1 3·4-in., 4 M.	..	9·0	..	83
d. v.	Zieten	I.	975	196 10	29 6	11 6	1	2323	Blackwall	1876	81,755	..	..	4 1·9 in. Q.F., 6 M.	..	16·0	140	111
to. g. b.	2 Torpedo Gunboats, D 9, D 10.	S.	380	..	..	..	2	4500	Elbing	1891	..	..	..	3 Q.F.	3 1 sub.	26·0	..	..
"	2 Torpedo Gunboats, D 7, D 8.	S.	350	213 3	..	..	2	4000	Elbing	1890 1891	..	..	..	3 Q.F.	3	26·0	140	..
"	2 Torpedo Gunboats, D 5, D 6.	S.	320	190 0	23 0	9 6	2	3600	Elbing	1888 1889	..	..	..	4 Q.F., 2 M.	3	22·0	..	..
"	2 Torpedo Gunboats, D 3, D 4.	S.	300	184 0	21 8	9 6	2	2500	Elbing	1888	..	..	..	4 Q.F., 2 M.	2	21·0	..	..

The Charlotte, Mars, Grille, Hay, Ulan, Gneisenau, Moltke, Stein and Stosch, in addition to others given in the list, are used as schoolships.

Note.—The torpedo-gunboats (Torpedo-Division boats) of 300 tons and over are included in this list, though they will also be found in the torpedo-boat tables.

The Imperial Yacht Hohenzollern, 4187 tons, 9160 I.H.P., 22 knots, carries 8 1·9-in. Q.F., but provision is made for mounting 3 4·1-in., 12 1·9-in. Q.F. and 4 M,

Merchant Cruisers (Auxiliaries to the German Navy).

To what Company belonging.	Name of Ship.	Displacement.	Length.	Beam.	Draught of Water.	Indicated H.P.	Ocean Speed.	When Built.	Armament of each Ship.
		tons.	ft. in.	ft. in.	ft. in.		knots.		
Hamburg-American S.S. Co.	Fürst Bismarck	10,500	502 0	50 10	23 3	16,400	19½	1891	8 5·9-in., 4 4·7-in., 2 3·4-in. Q.F., 2 2·2-in., 14 M.
	Normannia	10,500	498 9	57 6	22 3	16,250	19	1890	
	Columbia	9,500	462 6	56 0	19 8	13,680	19	1889	
	Augusta Victoria	9,500	459 3	56 0	23 0	12,280	18	1889	
North German Lloyds	Spree	8,900	462 6	51 10	22 0	12,770	19	1890	
	Havel	8,900	462 6	51 10	22 3	12,770	19	1890	
	Lahn	7,700	449 6	49 0	22 0	9,500	18½	1887	
	Aller	4,965	436 6	48 0	..	1,300(a)	16	1885	Not known.
	Saale	4,965	436 6	48 0	..	1,300(a)	16	1886	
	Trave	4,965	436 6	48 0	..	1,300(a)	16	1886	

(a) Nominal horse-power.

GREECE.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
												Belt.	Battery.	Deck Plating.	Guns.	Torpedo Tubes.			
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.	ins.			knots.	tons.	
c.d.s.	Basileos Georgios	I.	1774	200 2	36 0	15 6	2	2100	Blackwall	1867	..	7	6	9	2 8·2 in. (Krupp), 2 M., 4 l.	..	12 0	210	120
br.	Easilissa Olga* .	W.	2030	230 0	59 0	18 0	1	1950	San Rocco	1869	..	6	4½	..	4 6·6-in. 5½-ton (Krupp), 2 6·6-in. 3½-ton, 4 M., 4 l. .	..	10·0	240	400
b.	Hydra . .	S.	4885	334 6	51 10	23 3	2	7000	St. Nazaire	1889	..								
b.	Psara . . .	S.	4885	334 6	51 10	23 3	2	7000	Havre . .	1890	..	11¾	13½	2½	3 10·6 in. Canet, 5 5·9 in. do., 4·41 in. Q.F. 2 2.2 in. 16 M.	3	17·0	600	400
b.	Spetsai . .	S.	4885	334 6	51 10	23 3	2	7000	Havre . .	1889	..								

* Reported as receiving new mas's and guns.

The Hydra, Psara and Spetsai are to receive 1 3·9-in. Q.F. and 8 2·5-in. Q.F. guns (Canet), in addition to the present armament.

GREECE.—Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.									knots.	tons.	
g.v.	Acheloos	S.	420	130 0	24 6	11 6	1	400	Blackwall	1884	..	..	..	2 3·7-in. (Krupp), 3 M.	..	10·0	50	..
g.v.	Alphios	S.	420	130 0	24 6	11 6	1	400	Blackwall	1884	..	..	..	2 3·7-in. (Krupp), 3 M.	..	10·0	50	..
g.v.	Aphroessa	I.	380	124 7	22 11	9 10	1	160	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp)	..	9·0	30	..
g.v.	Eurotas	S.	420	130 0	24 6	11 6	1	400	Dumbarton	1884	..	..	..	2 3·7-in. (Krupp), 3 M.	..	10·0	50	..
corv.	Hellas (training)	W.	1654	200 2	37 0	19 4	1	1500	Northfleet	1858 rep. 1878–90	..	..	..	6 5·9-in. (Krupp), 2 M.	..	11·0	230	..
cr.	Mykale (transport)	S.	1000	210 6	32 6	18 0	2	2400	Glasgow	1880	..	..	..	2 M.	..	1·4	..	..
corv.	Nauarchos Miaulis	I. & W.	1800	246 0	36 0	14 5	1	2200	La Seyne	1879	..	..	..	3 6·6-in., 5½-ton (Krupp), 1 6·6-in. 3½-ton do., 2 M., 4 l.	..	15·0	220	250
g.v.	Paralos	I.	380	123 0	23 11	9 10	1	204	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp), 1 M.	..	8·0	60	..
g.v.	Pinios	S.	420	130 0	24 6	12 6	1	400	Dumbarton	1884	..	..	..	2 3·7-in. (Krupp), 3 M.	..	10·55	50	..
g.v.	Plixaura	I.	380	124 7	22 11	9 10	1	160	Pt. Glasgow	1856	..	..	..	1 3·4-in. (Krupp)	..	9·0	55	..
g.v.	Salaminia	I.	380	123 0	23 11	9 10	1	200	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp), 1 M.	..	8·0	60	..
corv.	Sfaktirea	S.	1000	216 6	29 3	18 0	1	2400	England	1885	..	..	..	2 3·9-in. (Krupp), 2 M.	..	14·5	100	100
g.v.	Syros	I.	380	124 7	22 11	9 10	1	160	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp)	..	9·0	18	..

Torpedo depôt-ship.—Kanaris, 1100 tons, 500 I.H.P., 2 3·9-in. (Krupp) guns, 2 Whitehead torpedo-launching guns on broadside, 2 under-water torpedo tubes ahead. 14 knots speed.

There are also 2 gunboats, Ambrakia and Aktion, of 440 tons displacement, 380 horse-power, 10 knot speed, fitted with 1 10·2-in. Krupp gun and 2 machine guns; launched 1885; 4 gunboats, A. B, Γ, Δ. (52 tons, 1 4·7-in. Krupp), launched 1881; 3 mining vessels (300 tons), launched 1881; and some smaller craft attached to the revenue service.

ITALY.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	ins.			knots.	tons.	
t.	Affondatore	I.	4062	290 0	40 0	20 0	1	3240	Millwall	1865	197,600	5	5	2	2 28-ton (Armstrong), 6 4·7-in. Q.F., 2 2·9-in., 4 2·2-in., 4 1·4-in., 2 M.	2	12·0	460	303
”	Ammiraglio di St. Bon	S.	9800	344 6	69 4	24 9	2	13,500	Venice	Bldg.	..	9¾–4 H.S.	9¾ H.S.	3–1½	4 10-in., 8 6-in. Q.F., 8 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	5	18·0	1000	..
a.c.	Ancona	I.	4460	256 0	50 0	25 0	1	2548	Bordeaux	1864	172,000	4½	4½	..	6 6-in. Q.F., 6 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	3	12·0	485	423
b.	Andrea Doria	S.	11,000	328 2	65 4	27 2	2	10,500	Spezia	1885	765,500	18 *comp.*	18 *comp.*	3	4 105-ton (Armstrong), 2 6-in. Q.F., 4 4·7-in., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub)	16·1	850	509
a.c.	Carlo Alberto	S.	6500	325 0	59 0	22 11	2	13,000	Spezia	Bldg.	..	6 H.S.	6 H.S.	1½	12 6-in. Q.F., 6 4·7-in., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	..	20·0	600	..
a.c.	Castelfidardo	I.	4250	256 0	50 0	21 11	1	2125	St. Nazaire	1863	233,000	4½	4½	13¾	6 6-in. Q.F., 6 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	3	12·0	485	423
t.	Dandolo *	I&S	11,202	340 11	64 9	26 7	2	8045	Spezia	1878	872,640	21½	18	2	4 10-in. (Armstrong), 7 6-in. Q.F., 5 4·7-in., 2 2·9-in., 10 2·2-in., 14 1·4-in., 2 M.	4	15·6	1000	487
t.	Duilio	I&S	11,138	340 11	64 9	26 7	2	7710	Castellammare	1876	850,400	21½	18	2	4 100-ton M.L.R. (Armstrong), 3 4·7-in. Q.F., 2 2·9-in., 8 2·2-in., 22 1·4-in., 2 M.	4	15·0	1000	487
t.	Emanuele Filiberto	S.	9800	344 6	69 4	24 9	2	13,500	Castellammare	Bldg.	..	9¾–4	9¾	3–1½	4 10-in., 8 6-in. Q.F., 8 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	5	18·0	1000	..
b.	Francesco Morosini	S.	11,000	328 2	65 4	27 2	2	10,000	Venice	1885	770,680	18 *comp.*	18 *comp.*	3	4 105-ton (Armstrong), 2 6-in., 4 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub)	17·0	850	509
a.c.	Giuseppe Garibaldi†	S.	6840	328 0	59 8	23 3	2	13,000	Sestri Ponente	Bldg	520,000	6	6	1½	2 9·8-in., 10 6-in. Q.F., 6 4·7-in., 2 2·9-in., 10 2·2-in. 10 1·4-in., 2 M.	..		600	..
”	Italia	S.	14,387	400 6	74 0	31 2	2	11,986 (*t*)	Castellammare	1880	1,167,680	16 funnel op'nings	19 *comp.*	3	4 100-ton (Armstrong), 8 6-in., 4 4·7-in. Q.F., 12 2·2-in., 26 1·4-in., 2 M.	4	18·0	1650	748
b.	Lepanto	S.	14,400	400 6	74 0	31 2	2	15,800 (*t*)	Leghorn (Orlando)	1883	1,150,880	16 funnel op'nings	19 *comp.*	3	4 100-ton (Armstrong), 8 6-in., 4 4·7-in. Q.F., 12 2.2-in., 34 1·4-in., 2 M.	4	18·38	1650	748
a.c.	Marco Polo	S.	4583	327 0	48 3	19 6	2	10,000	Castellammare	1890	344,400	4	4	1	6 5·9-in. Q.F., 10 4·7-in., 2 2·9-in., 9 2·2-in., 4 1·4-in., 2 M.	4	19.0	..	315
a.c.	Maria Pia	I.	4268	256 0	49 4	22 7	1	2924	La Seyne	1863	215,000	4½	4½	..	8 5·9-in., 6 4·7-in. Q.F., 2 2·9-in. 10 2·2-in. 10 1·4-in., 2 M.	2	12·0	485	423
b.	Re Umberto	S.	13,298	400 0	76 9	28 6	2	19,500	Castellammare	1888	1,058,500	4	18	3	4 67-ton (Armstrong), 8 6-in. Q.F., 16 4·7-in., 2.9 in., 15 2·2-in., 14 1·4-in., 2 M.	8	18·2	1200	785
b.	Ruggiero di Lauria	S.	11,000	328 2	65 4	27 2	2	10,600	Castellammare	1884	777,560	18 *comp.*	18 *comp.*	3	4 105-ton (Armstrong), 2 6-in. Q.F., 4 4·7-in., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub.)	17·0	850	509
a.c.	San Martino (training service)	I.	4268	256 0	49 4	22 7	1	2620	La Seyne	1863	213,880	4½	4½	..	8 5·9-in., 6 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	2	12·0	490	423
b.	Sardegna	S.	13,860 (*t*)	411 0	76 9	28 6 (*t*)	2	20,800 (*t*)	Spezia	1890	1,057,440	4	14½ *comp.*	3	4 67-ton (Armstrong), 8 5·9-in. Q.F., 16 4·7-in., 2 2·9-in., 20 2·2-in., 10 1·4-in., 2 M.	5	20·0 (*t*)	1200	785
”	Sicilia	S.	13,298	400 0	76 9	28 6	2	19,500	Venice	1891	1,050,000	4	18 *comp.*	3	4 67-ton (Armstrong), 8 5·9-in. Q.F., 16 4·7-in., 2 2·9-in., 20 2·2-in., 10 1·4-in., 2 M.	5	19·0	1200	785
a.c.	Varese‡	S.	6840	328 0	59 8	23 3	2	13,000	Leghorn (Orlando)	Bldg.	..	6 H.S.	6 H.S.	1½	2 9·8-in., 10 5·9-in. Q.F., 6 4·7-in., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	5	20·0	600	..
a.c.	Vettor Pisani	S.	6500	325 0	59 0	22 11	2	13,000	Castellammare	1895	..	6 H.S.	6 H.S.	1½	12 6-in. Q.F., 6 4·7-in., 2 2·9-in., 10 2·2-in. 10 1·4-in., 2 M.	5	20·0	600	..

* New armament given; Duilio to receive the same. † Building to replace the cruiser sold to the Argentine Government. ‡ Reported sold to Argentine Government.

Note.—The Palestro, Principe Amedeo, and Roma are non-effective, or only available for coast defence.

ITALY.—Cruising Ships.

Class	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armaments: Guns.	Armaments: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
to.cr.	**Agordat**	S.	1313	289 0	30 6	11 1	2	..	Castellammare	Bldg.	..	..	1	.. .. ..	..	23·0	..	111
3rd cl. *cr.*	**Amerigo Vespucci** (training)	S.	2795	255 11	42 7	17 0	1	3340	Venice	1882	176,300	..	¾	6 5·9-in., 4 2·2-in., 8 1·4-in., 2 1., 4 M.	2	14·0	500	265
g.v.	**Andrea Provana**	S.	649	167 4	26 3	10 2	1	1080	Leghorn (Orlando)	1884	39,760	..	..	4 4·7 in., 3 1·4-in., Q.F.	..	13·0	120	103
d.v.	**Archimede**	S.	784	230 0	26 3	10 0	1	1700	Venice	1887	60,120	..	..	4 4·7-in., 2 2·2-in. Q.F., 2 1·4-in.	2	16·0	210	109
to.g.b.	**Aretusa**	S.	846	230 0	26 10	11 9	2	4420	Leghorn (Orlando)	1891	72,920	..	1	1 4·7-in., 6 2·2-in., and 3 1·4-in.	6	20·7	180	111
3rd cl. *cr.*	**Calabria**	S.	2470	249 4	42 0	16 7 aft.	2	6500	Spezia	1894	183,120	..	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	19·0	500	257
to.g.b.	**Calatafimi**	S.	840	229 6	27 0	10 2	2	4000	Castellammare	1893	72,920	..	1	1 4.7-in. Q.F., 6 2·2 in., 3 1·4-in.	6	20 0	120	111
"	**Caprera**	S.	853	230 0	27 4	10 2	2	4800	Leghorn (Orlando)	1894	72,920	..	1	2 4·7-in. Q.F., 4 2·2-in., 2 1·4-in. Q.F.	5	21·0	180	111
g.v.	**Cariddi**	W.	1050	177 2	28 6	12 5	1	956	..	1875	65,480	..	..	2 4·7-in., 4 2·2-in. Q.F.	..	10·0	164	..
"	**Castore**	S.	530	116 0	36 0	9 6	1	364	Pozzuoli (Armstrong)	1889	68,120	..	..	1 15·7-in. (Krupp), 2 1·4-in. Q F.	..	8·0	..	40
to.cr.	**Coatit**	S.	1313	289 0	30 6	11 1	2	..	Castellammare	Bldg.	..	..	1	.. .. ..	..	23·0	..	111
to.g.b.	**Confienza**	S.	768	230 0	25 6	9 0	2	1887	Spezia	1887	61,480	..	1	1 4·7-in. Q.F., 6 2·2-in., 2 1·4-in.	4	17·0	180	111
3rd cl. *cr.*	**Cristoforo Colombo**	S.	2675	249 0	36 0	17 6	..	3800	Venice	1892 Reblt.	157,240	..	..	6 4·7-in., 4 2·2-in., Q.F., 4 1·4-in.	..	16·0	500	203
g.v.	**Curtatone**	S.	1040	177 3	32 8	13 6	1	1100	Venice	1887	58,440	..	..	6 4·7-in. Q.F., 4 2·2-in., 2 1·4-in., 2 M.	..	12·0	197	131
3rd cl. *cr.*	**Dogali**	S.	2088	250 0	37 0	14 6	2	7600	Elswick	1887	156,040	4½	2	6 6-in. (Armstrong), 1 2·9-in., 9 2·2-in. Q.F., 2 1·4-in., 2 M.	4	19·66	480	257
"	**Elba**	S.	2730	272 6	40 8	16 7	2	7471 (*t*)	Castellammare	1893	200,000	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	4	17·9(*t*)	..	257
2nd cl. *cr.*	**Etna**	S.	3530	282 2	42 7	19 0	2	7480	Castellammare	1885	226,720	5	1½	2 9·8-in. (Armstrong), 6 5·9-in., 1 2·9 in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·8	630	315
to.g.b.	**Euridice**	S.	840	229 6	27 0	10 2	2	4000	Castellammare	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	19·8	120	111
3rd cl. *cr.*	**Etruria**	S.	2280	262 6	39 6	16 7	2	7585 (*t*)	Leghorn (Orlando)	1891	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 10 1·4-in., 2 M.	2	19·84 (*t*)	400	257
2nd cl. *cr.*	**Fieramosca**	S.	3600	290 0	43 6	19 4	2	7700	Leghorn (Orlando)	1888	240,120	5	1½	2 9·8-in., 6 6-in. Q.F., 1 2·9-in., 5 2·2-in., 8 1·4-in., 2 M.	4	17·5	590	315
3rd cl. *cr.*	**Flavio Gioja** (training)	S.	2533	255 11	42 7	17 0	1	4150	Castellammare	1881	193,920	..	1½	6 5·9-in., 4 2·2-in. Q.F., 8 1·4-in., 2 1., 4 M.	2	15·0	500	265
to.g.b.	**Folgore**	S.	370	187 0	19 8	6 7	2	2040	Castellammare	1886	39,840	..	..	2 6-pr. and 4 3-pr. Q.F.	4	20·0	60	45
d.v.	**Galileo**	S.	770	230 0	26 3	8 2	1	1700	Venice	1887	56,720	..	..	4 4·7-in., 2 2·2-in. Q.F., 2 1·4-in.	2	15·0	210	109
3rd cl. *cr.*	**Giovanni Bausan**	S.	3068	275 7	42 7	18 4	2	6500	Elswick	1883	179,120	5	1½	2 9·8-in. (Armstrong), 6 5·9-in., 1 2·9-in., 4 2·2-in. Q.F., 8 1·4-in., 2 M.	3 (1sub.)	17·5	600	267
to.g.b.	**Goito**	S.	812	230 0	25 6	11 9	2	2620	Castellammare	1887	70,680	..	1	4 2·2-in. Q.F., 5 1·4-in.	5	19·0	180	111
g.v.	**Governolo**	S.	1255	185 0	33 9	13 9	1	1100	Venice	1894	58,440	..	..	4 4·7-in. Q.F., 4 2·2-in., 2 1·4-in., 2 M.	..	13·0	200	131
to.g.b.	**Iride**	S.	840	229 6	27 0	10 2	2	4000	Castellammare	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	19·6	120	111

(*t*) Amended particulars of trials given last year.

ITALY.—Cruising Ships.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armaments. Guns.	Armaments. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
3rd cl. cr.	Liguria	S.	2280	262 6	39 4	16 9	2	7677 (t)	Sestri (Ansaldo)	1893	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 10 1·4-in., 2 M. (2 Maxims).	2	18·0	430	257
" "	Lombardia	S.	2380	262 6	39 6	16 7	2	6843 (t)	Castellammare.	1890	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	17·0 (t)	430	257
d.v.	Marcantonio Colonna	S.	656	216 6	23 11	10	1	1700	..	1879	51,480	..	..	5 2·2-in. Q.F., 2 M.	..	15·4	197	100
to.g.b.	Minerva	S.	846	246 0	27 6	11 9	2	4800	Sestri (Ansaldo)	1892	72,720	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	19·0	120	111
"	Montebello	S.	814	230 0	25 6	11 9	3	2776	Spezia	1888	74,120	..	1	6 2·2-in. Q.F., 2 1·4-in.	4	19·0	100	111
"	Monzambano	S.	810	230 0	25 6	11 9	3	1953	Spezia	1888	70,680	..	1	6 2·2-in. Q.F., 2 1·4-in.	4	17·0	100	111
"	Partenope	S.	840	246 0	27 6	11 9	2	4200	Castellammare.	1890	71,000	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	19 0	100	111
3rd cl. cr.	Piemonte	S.	2500	300 0	38 0	15 0	2	12,000	Elswick	1888	220,000	3	3	6 6·6-in. Q.F., 6 4·7-in., 10 2·2-in., 6 1·4-in., 4 M.	3	21·0	560	296
g.v.	Polluce	S.	530	116 0	36 0	9 6	1	390	Pozzuoli (Armstrong)	1889	68,120	..	..	1 4·7-in. (Krupp), 2 1·4-in. Q.F.	..	8·0	..	40
3rd cl. cr.	Puglia	S.	2550	273 0	40 9	16 9	2	1000	Taranto	Bldg.	..	4½	1	4 5·9-in. Q.F., 6 4.7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	..	20·0	650	257
d.v.	Rapido	I.	1568	262 5	30 6	12 6	1	1920	Leghorn (Orlando)	1876	77,400	..	..	5 2·2 in. Q.F., 2 M.	..	13·4	300	135
to.g.b.	Saetta	S.	400	187 0	19 8	6 7	2	2400	Castellammare.	1887	38,880	..	..	2 2·2-in. Q.F., 4 1·4-in.	3	20·0	90	58
cr.	Savoia (used as the Royal Yacht)	S.	2850	275 6	42 7	17 0	1	3340	Castellammare.	1883	176,160	..	1·5	6 2·2-in. Q.F., 6 1·4-in., 4 1., 2 M.	2	14·0	600	216
g.v.	Scilla	W.	1076	177 2	28 6	12 5	1	826	Castellammare	1874	65,520	..	..	4 2·2-in. Q.F., 2 M.	..	10·0	140	111
"	Sebastiano Veniero	S.	629	170 0	26 3	10 6	1	1160	Leghorn (Orlando)	1884	36,160	..	..	4 4·7-in., 3 1·4-in. Q.F.	..	13·0	150	103
d.v.	Staffetta	I.	1388	252 7	30 10	13 2	1	1800	S. Pierdarena (Ansaldo)	1876	82,600	..	..	4 4·7-in., 7 1·4-in. Q.F.	1	13·5	300	135
2nd cl. cr.	Stromboli	S.	3475	282 2	42 7	19 0	2	6252	Venice	1886	220,080	5	1·5	2 9·8-in. (Armstrong), 6 5·9-in., 1 2·9-in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·0	630	315
to. g.b.	Tripoli	S.	848	230 0	25 10	11 9	3	2543	Castellammare.	1886	72,080	..	1	4 2·2-in. Q.F., 4 1·4-in.	5	18·0	130	111
3rd cl. cr.	Umbria	S.	2280	262 6	39 6	16 7	2	7104 (t)	Leghorn (Orlando)	1891	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in, 8 2·2-in., 10 1·4-in., 1 1., 2 M.	4	18·83 (t)	430	257
to. g.b.	Urania	S.	846	230 0	27 0	11 2	2	4000	Sestri (Odero)	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	20·0	120	111
d.v.	Vedetta	I.	827	183 9	26 11	11 5	1	670	Genoa	1866	32,400	..	..	4 4·7-in., 6 1·4-in. Q.F.	..	11·0	137	40
2nd cl. cr.	Vesuvio	S.	3427	282 2	42 7	19 0	2	6820	Leghorn (Orlando)	1886	218,320	5	1·5	2 9·8-in., 6 5·9-in., 1 2·9-in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·0	600	315
g.v.	Volturno	S.	1040	177 3	32 8	14 4	1	1100	Venice	1887	58,960	..	..	4 4·7-in., 4 2·2-in. Q.F., 2 1·4-in., 2 M.	..	13·0	206	131

(*t*) These are amended particulars of official trials.

Auxiliary cruisers and despatch vessels.—Nord America, Vittoria, Duca de Galliera, and Duchessa di Genova (La Veloce S.S. Co.), Regina Margherita, Elettrico, Candia and Malta (Navigazione Generale). The armament of these vessels is 2 4·7-in. Q.F., and 4 1·4-in. M.

Two cruisers, the Regina Margherita and Principe di Napoli, were projected, but it is doubtful whether they will be commenced.

JAPAN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.	inches.			knots.	tons.	
b.	Chin-Yuen-Go (Ex. Chen Yuen)	S.	7400	308 5	59 0	20 0	2	.6200	Stettin	1882	..	14	12	3	4 12-in. (Krupp), 2 5·9-in., 8 l., 8 M.	3	14	1000	250
a.c.	Chiyoda	S.	2450	308 0	42 6	14 0	2	5600	Clydebank	1889	..	4½	..	1–2	10 4·7-in. Q.F., 14 3-pr., 3 M.	3	17·5	420	300
b. b.	Yashima Fuji	S.	12,450	374 0	73 0	26 6	2	14,000	Elswick Thames	1896	..	18—6 H. S.	14	2½	4 12-in., 10 6-in. Q.F., 14 3-pr., 10 2½-pr.	5 (4 sub)	18·0	1100	..
c.b.	Fu-Sö	I.	3718	220 0	48 0	18 4	2	3500	Thames	1877	..	7	9	..	4 9·4-in. (Krupp), 2 6·6-in., 4 l., 5 M.	..	13·2	360	386
a.c.	Hi-yei *	C.	2200	231 0	40 9	17 4	1	2490	Milford	1878	..	4½	..	..	3 6·6-in. (Krupp), 6 5·9-in., 4 M., 1 l.	..	13·0	280	308
”	Kon-go *	C.	2200	231 0	40 9	17 4	1	2450	Hull	1877	..	4½	..	..	3 6·6-in. (Krupp), 6 5.9-in., 4 M., 1 l.	..	13·7	280	308
c.d.s.	Ping-Yuen-Go (Ex. Ping Yuen.)	S.	2000	200 0	40 0	16 0	2	2400	Foo Chow	1890	..	8	5	2	1 10·2-in. (Krupp), 2 5.9-in., 6 M.	4	11·0	350	250
a.c.	Riojo *	C.	2459	213 0	34 0	17 4	1	975	Thames	1864	..	4½	..	..	1 6-in. (Krupp)	..	9·0	350	306
b.	Two ships	..	15,000	..	..	..	..	..	..	pro.	..	..	..	..	4 11·8-in., 12 5·9-in. Q.F., 30 smaller	5	18·0	..	..

* These are now used as training ships; they have no armour as against end-on fire, and no armoured deck.

JAPAN.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun position.	Deck.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
g.v.	Akagi	S.	615	164	0	27	0	10	0	1	700	Japan .	1889	..	..	..	1 8·2-in., 1 5·9-in., 2 1., 2 M.	..	13·0	..	113
"	Akasaki . . .	S.	1800	304	6	..		13	0	2	6000	Japan .	Bldg.	..	..	..	8 4·7-in. Q.F., 12 3-pr., 4 M. .	2	21·0	200	..
cr.	Akaski . . .	S.	2700	306	9	40	0	16	4	2	8000	Japan .	Bldg.	..	..	2–1	2 6-in. Q.F., 6 4·7-in. 12 3-pr.	3	20·0	..	..
cr.	Akitsushima . .	"	3150	302	0	42	7	18	5	2	8400	Japan .	1892	..	4½	3	4 6-in. Q.F., 6 4·7-in., 10 3-pr.	4	19·0	..	330
g.v.	Atago	S.	615	154	0	27	0	10	6	2	700	Japan .	1887	..	..	..	1 8·2-in., 1 4·7-in., 2 M. .	..	12 0	..	113
"	Banjo	W.	656	154	0	25	0	12	0	1	590	Japan .	1879	..	..	..	1 6-in., 2 4¾-in , 1 M. . .	..	10·0	107	115
cr.	Hashidate . . .	S.	4277	295	0	50	10	21	2	2	5400	Japan .	1891	..	12	2	1 12·5-in. (Canet), 11 4·7-in. Q.F., 5 6-pr., 11 3-pr., 6 M.	4	17·0	400	350
"	Itsukushima . .	"	4277	295	0	50	10	21	2	2	5400	La Seyne .	1891	..							
g.v.	Iwaki	W.	700	147	0	25	0	11	0	1	700	Japan .	1883	..	..	..	1 5·9-in., 2 4·7-in. . .	..	10·0	600	115
"	Izumi (ex Esmeralda) .	S.	2716	270	0	40	0	18	3	2	6500	Elswick .	1878	..	22	5–1	2 10 2-in., 6 4·7-in. Q.F., 2 1. 6 M.	3	18	400	300
t.c.	Kohei-Go (ex Kuang Ping)	C.	1000	236	0	27	6	11	4	2	2400	China .	1889	..	..	..	3 4·7-in., 4 1., 4 M. . .	..	16·5	..	..
"	Katsuraki . . } Musashi . . }	S.	1476	206	9	36	0	15	0	2	1600	Japan .	1885	..	..	..	2 6-in. (Krupp), 5 4·7-in., 2 M.	2	13·0	..	242
g.v.	Maya	S.	615	154	0	27	0	10	0	2	700	Japan .	1886	..	..	..	1 8·2-in., 1 4·7-in., 2 M. .	..	13·0	60	113
c.d.s.	Matsushima . .	S.	4277	295	0	50	10	21	2	2	5400	La Seyne .	1890	..	12	2	1 12·5-in. (Canet), 11 4·7-in. Q.F., 5 6-pr., 11 3-pr., 6 M.	4	17·5	400	350
"	Naniwa . . .	S.	3650	300	0	46	0	18	6	2	7235	Elswick .	1885	..	1½	3–2	2 10·2-in. (Armstrong), 6 5·9-in. (Krupp), 2 3-pr. 10 M. .	4	18·72	800	350

JAPAN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
g.v.	**Oshima**	S.	630	164 0	27 0	10 0	1	700	Japan	1890	..	..	..	4 4·7-in., Q.F., 8 l.	..	13·0	..	..
cr.	**Sai yen** (*ex* Tsi Yuen)	S.	2300	263 3	33 0	15 9	2	2800	Sttin	1883	..	9	3	2 8·2-in., 1 5·9-in., 4 l. 10 M.	4	14·5	230	200
,,	**Sei-ki**	W.	900	200 0	30 6	14 2	1	720	Japan	1875	..	..	..	1 5·9-in., 4 4·7 Q.F., 2 M.	..	11·0	130	..
,,	**Suma**	S.	2700	306 9	40 0	..	2	8000	Japan	1895	..	..	2–1	2 6-in. Q.F., 6 4·7-in., 12 3-pr.	3	20·0	200	..
,,	**Takao**	S.&W.	1774	230 0	33 0	13 0	2	2330	Japan	1888	..	..	..	4 6-in. Q.F., 1 4¾-in. do., 6 M.	2	15·0	300	255
,,	**Takachiho**	S.	3700	300 0	46 0	18 6	2	7500	Tyne	1885	..	1½	3–2	2 10·2-in. (Armstrong), 6 5·9-in., 2 3-pr., 10 M.	4	18·7	800	365
to.g.b.	**Tatsuta**	S.	875	240 0	27 6	13 0	2	5500	Elswick	1894	..	..	..	2 4·7-in. Q.F., 4 3-pdr.	5	21·0	200	..
,,	**Ten-riu**	W.	1500	200 0	32 0	16 5	1	1250	Japan	1882	..	..	..	1 6·6-in. (Krupp), 6 4·7-in., 2 l.	..	12·0	256	222
cr.	**Tsukushi** (*ex* Arturo Prat)	S.	1350	210 0	32 0	15 0	2	2887	Elswick	1882	..	4½	..	2 10-in. (Armstrong), 4 4·7-in. Q.F., 2 l., 4 M.	2	16·5	250	190
,,	**Yayeyama**	S.	1600	315 0	34 6	15 0	2	5400	Japan	1889	..	..	..	3 4·7-in. Q.F., 6 M.	2	20·0	..	200
,,	**Yamato**	..	1476	206 9	36 0	15 0	1	1600	Japan	1885	..	..	..	2 6·6-in. (Krupp), 5 4·7-in., 4 M.	2	13·0	..	242
,,	**Yoshino**	S.	4150	350 0	46 6	17 0	2	15,000	Elswick	1892	..	4½	4½–1¾	4 6-in. Q.F., 8 4·7-in., 22 3-pr.	5	23·0	1000	300
t.g.b.	New Ship	S.	875	240 0	27 8	..	2	5500	Japan	Bldg.	..	..	..	2 4·7-in. 4 3-pr.	..	..	..	..

It is stated that the new Naval Programme will comprise 4 battleships each of 15,000 tons displacement; 4 7500-ton cruisers, 3 4500-ton cruisers, 2 3000-ton cruisers, and several smaller vessels. *Cf.* pp. 56, 57.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Turret.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.	inches.			knts.	tons.	
c.d.s.t.	Bloedhond	I.	1683	180 0	46 3	9 6	2	680	Amsterdam	1869	..	5½	8	..	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·5	90	..
”	Cerberus	I.	1584	180 0	44 0	9 7	2	617	Amsterdam	1869	..	5½	8	..	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M	..	7·0	90	..
”	Draak	I.	2234	201 5	49 3	10 10	2	807	Amsterdam	1877	..	8	9	1	2 11-in. (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	100	137
”	Evertsen	S.	3400	283 0	47 0	16 9	2	4500	Flushing	1894	..	6 H.S.	9½ H.S.	2½	3 8·2-in., 2 5·9-in., 6 2·9-in. Q.F., 6 1·4-in.	3	20·0	..	260
”	Haai	I.	1590	186 4	44 0	10 2	2	672	Rotterdam	1871	..	5½	8	..	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	70	134
”	Heiligerlee	I.	1543	180 0	43 7	9 6	2	630	Birkenhead	1868	..	5½	8	..	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	90	..
”	Hijena	I.	1580	186 4	44 0	10 2	2	654	Amsterdam	1871	..	5½	8	..	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·0	70	134
a.g.b.	Isala	I.	333	150 11	24 11	4 3	2	306	Amsterdam	1876	..	4	5	⅝	2 4·7-in. (Krupp)	..	7·0	27	..
t.	Koning der Nederlanden	I.	5400	269 0	49 3	20 0	2	4500	Amsterdam	1874	..	8	9	3	4 11-in. 25-ton M.L.R. (Armstrong), 4 4·7-in. (Krupp), 2 2·9-in., 4 1·4-in. Q.F., 6 M.	..	11·0	620	256
t. & b.	Koningin Wilhelmina der Niederlanden	I.	4600	328 0	49 3	19 8	2	5900	Amsterdam	1892	..	..	11	3	1 11-in., 1 8·2-in., 2 6·6-in., 2 2·9-in., 4 2·9-in. Q.F., 6 1·4-in., 6 M.	3	17·0	450	127
c.d.s.t.	Kortenaer	S.	3400	283 0	47 0	16 9	2	4500	Amsterdam	1894	..	6 H.S.	9½ H.S.	2½	3 8·2-in., 2 5·9-in., 6 2·9-in. Q.F., 6 1·4-in.	3	20·0	..	260
”	Krokodil	I.	1547	180 0	43 7	9 6	2	630	Birkenhead	1868	..	5½	8	..	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	..	90
”	Luipaard	I.	1610	186 4	44 0	9 2	2	680	Rotterdam	1876	..	5½	8	..	1 11-in. 28-ton (Krupp), 1 2·9-in. 2 3-pdr. Q.F., 2 M.	..	8.0	70	134

NETHERLANDS.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.	inches.			knts.	tons.	
c.d.s.t.	Matador	I.	1935	201 5	49 3	10 2	2	691	Rotterdam	1878	..	5½	9		2 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7 0	100	134
a.g.b.	Merva	I.	383	150 11	24 11	4 3	2	395	Amsterdam	1879	..	4	5	⅝	2 4·7-in. (Krupp)	.	7·0	27	127
„	Mosa	I.	373	150 11	24 11	4 3	2	400	Amsterdam	1878	..	4	5	⅝	2 4·7-in. (Krupp)	..	7·0	27	127
b. Ram	New Ships (A 4, A 5, A 6)*	S.	3400	283 0	47 0	16 9	2	4500	..	Pro.	..	6	9½	2½	3 8·2-in., 2 5·9-in., 6 2·9-in. Q.F., 6 1·7-in.	2	16·0	..	..
c.d.s.t.	Panter	I.	1580	186 4	44 0	10 2	2	660	Amsterdam	1870	..	5½	8	..	1 11-in. 28-ton (Krupp), 1 2·9-in. 2 3-pr. Q.F., 2 M.	..	7·0	70	134
c.d.s.t.	Piet-Hein	S.	3400	283 0	47 0	16 9	2	4500	Rotterdam	1894	..	6 H.S.	9½ H.S.	2½	3 8·2-in., 2 5·9-in., 6 2·9-in., Q.F., 6 1.4-in.	2	16·0	..	260
t.	Prinz Hendrik der Nederlanden	I.	3375	229 7	42 7	18 1	1	2000	Birkenhead	1866	..	4½	5½	⅝	4 9-in. 13-ton M.L.R. (Armstrong), 4 4·7-in. (Krupp), 2 2·9-in., 4 1·4-in. Q.F., 6 M.	..	12·0	350	243
t. & b.	Reinier Claeszen	S.	2490	229 7	44 3	15 0	2	2400	Amsterdam	1891	..	4¾–2 *comp.*	11	3	1 8·2-in. (Krupp), 1 6·6-in., 1 2·9-in., 3 3-pr. Q.F., 3 M.	2	16·5	160	243
a.g.b.	Rhenus	I.	388	150 11	24 11	4 3	2	310	Amsterdam	1877	..	4	5	⅝	2 4·7-in. (Krupp)	..	7·0	27	127
c.d.s.t.	Schorpioen	I.	2235	193 3	38 0	15 10	2	2225	La Seyne	1868	..	6	8	1	1 11-in. 28-ton (Krupp), 2 2·9-in., 5 3-pr. Q.F., 2 M.	..	12·0	200	162
„	Stier	I.	2112	194 10	38 0	15 6	2	2257	Birkenhead	1868	..	6	8	1	1 11-in. 28-ton (Krupp), 2 2·9-in., 5 3-pr. Q.F., 2 M.	..	12·4	160	156
„	Tijger	I.	1450	187 0	44 0	8 10	2	684	Glasgow	1868	..	5½	8	..	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	70	..
a.g.b.	Vahalis	I.	365	120 5	27 6	5 3	2	243	Rotterdam	1870	..	4½	..	⅝	2 3-pr. Q.F.	..	6·0	22	127
c.d.s.t.	Wesp	I.	1580	186 4	44 0	10 2	2	744	Amsterdam	1871	..	5½	8	..	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	70	134

* These armoured rams, Evertsen type, are projected for the Indian Navy.

NETHERLANDS.—Cruising Ships.

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
cr.	Alkmaar	Cp.	1068	154 3	30 2	15 9	1	732	Amsterdam	1874	..	..	..	1 5·9-in. (Krupp), 6 4·7-in., 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	10·0	130	112
1st cl. cr.	Atjeh	I. & W.	3440	262 5	39 4	20 7	1	2700	Amsterdam	1876	..	..	..	6 6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pr. Q.F., 6 M.	..	14·5	380	304
g. v.	Bali (I)	I. & W.	853	147 7	29 6	11 10	1	446	Rotterdam	1878	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·5	100	100
"	Batavia (I)	I. & W.	853	147 7	29 6	11 10	1	405	Amsterdam	1876	..	..	..	1 7-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	100	100
"	Benkoelen (I)	I. & W.	853	147 7	29 6	11 10	1	446	Rotterdam	1879	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·5	100	99
"	Bonaire	I. & W.	853	147 7	29 6	11 10	1	412	Rotterdam	1877	..	..	..	1 5·9-in., 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	9·0	100	87
"	Borneo (I)	S. & W.	829	177 2	33 10	12 6	..	1040	Glasgow	1892	..	..	..	6 4·1-in., 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	13·0	124	106
"	Ceram (I)	S.	550	157 4	25 4	10 6	1	650	Flushing	1887	..	..	..	3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	11·0	60	99
"	Condor (I)	Cp.	320	126 0	21 0	10 0	1	300	Amsterdam	1885	..	..	..	2 2¾-in., 2 6-pr. Q.F.	..	10·0	25	..
1st cl. cr.	De Ruyter	I. shd.	3517	262 5	39 4	20 7	1	3305	Amsterdam	1880	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pr. Q.F., 6 M.	..	14·5	380	340
g. v.	Flores (I)	S.	550	157 0	25 6	10 6	1	650	Amsterdam	1887	..	..	..	3 4·7-in, 1 2·9-in., 2 1·4-in. Q.F.	..	11·0	60	99
cr.	Friesland	S.	3900	306 0	48 6	17 8	2	9250	Feijenoord	Bldg.	285,700	4½	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	20·0	800	..

NETHERLANDS.—Cruising Ships—*continued.*

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
cr.	Holland	S.	3900	306 0	48 6	17 8	2	9250	Amsterdam	Bldg.	285,700	4½	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	20·0	800	..
g.v.	Java (I)	I. & W.	1300	197 0	31 3	12 3	1	1055	Rotterdam	1885	..	..	..	1 6-in., 3 4¾-in., 1 2·9-in., 2 1·4-in. Q.F.	..	10·6	125	112
1st cl. cr.	Johan Willem Friso	I. & W.	3732	262 5	39 4	20 7	1	3000	Amsterdam	1886	..	..	..	6 6·6-in. 6-ton (Krupp), 8 4·7-in., 2 2·9-in., 8 3-pr. Q.F., 6 M.	2	14·5	380	296
1st cl. cr.	Koningin Emma der Nederlanden	I. & W.	3528	262 5	39 4	20 7	1	2732	Amsterdam	1879	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pr. Q.F., 6 M.	..	14·6	380	296
g.v.	Lombok (I)	S. & W.	596	158 0	26 3	10 5	..	950	Amsterdam	1890	..	..	..	3 4·7-in., 1 2·9-in., 2 3-pr. Q.F.	..	12·5	65	87
"	Macassar (I)	I. & W.	853	147 7	29 6	11 10	1	394	Amsterdam	1876	..	..	..	1 7-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	100	104
"	Madura (I)	I. & W.	853	147 7	29 6	11 10	1	559	Amsterdam	1880	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·7	100	100
"	Nias (I)	S.	810	167 4	30 9	11 0	2	1100	Amsterdam (Huygens)	1895	..	..	..	3 4.7-in., 2 1·4-in. Q.F.	..	14·0	..	..
"	Padang (I)	I. & W.	853	147 7	29 6	11 10	1	409	Rotterdam	1878	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·4	100	100
"	Pelikaan (I)	S. & W.	400	158 0	26 3	10 5	..	485	Rotterdam	1891	..	..	..	3 4·7-in. Q.F., 1 3-in., 2 3-pr. do.	..	11·35	..	..
"	Pontianak (I)	C.	654	147 7	29 6	11 10	1	360	Amsterdam	1873	..	..	..	1 6·2-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	8·5	85	100
"	Samarang (I)	I. & W.	853	147 7	29 6	11 10	1	460	Rotterdam	1876	..	..	..	1 7-in. 7-ton M.L.R. (Armstrong) 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	100	104
"	Sambas (I)	C.	654	137 10	28 10	11 10	1	374	Rotterdam	1874	..	..	..	1 7-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2.9-in., 2 1·4-in. Q.F.	..	8·5	85	100
sl.	Sommelsdijk	I. & W.	1013	147 7	31 2	11 9	1	722	Amsterdam	1882	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	10·0	95	91
cr.	Sumatra (I)	S.	1720	216 6	36 9	14 0	2	3750	Amsterdam	1891	..	..	..	1 8·2-in., 1 6·9-in., 2 4·7-in., 6 3-pr. Q.F., 2 M.	2	17·0	170	177
g.v.	Sumbawa (I)	S.	600	158 0	26 3	10 5	..	950	Flushing	1891	..	..	..	3 4·7-in., 1 2·9-in., 2 3-pr. Q.F.	..	12·5	70	87
"	Suriname	I. & W.	884	147 7	29 6	11 10	1	440	Amsterdam	1877	..	..	..	1 5·9-in. (Krupp), 3 4·7-in., 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	9·0	95	96
1st cl. cr.	Tromp	I. & W.	3512	262 5	39 4	20 7	1	2772	Amsterdam	1877	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pdr. Q.F., 6 M.	..	14·3	380	336
corv.	Van Galen	W.	2160	193 6	41 6	18 2	1	833	Amsterdam	1872	..	..	..	10 4·7-in. (Krupp), 2 2·9-in., 2 1·4-in. Q.F.	..	10·0	400	240
1st cl. cr.	Van Speyk	I. & W.	3728	262 5	39 4	20 7	1	2891	Amsterdam	1882	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pr. Q.F., 6 M.	..	14·2	380	296
cr.	Zeeland	S.	3900	306 0	48 6	17 8	2	9250	Flushing	Bldg.	285,700	4½	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	20·0	800	..
g.v.	Zwaluw (I)	C.	340	123 0	21 0	10 0	1	320	Flushing	1882	..	..	..	2 3-in., 2 2-in.	..	10·5	..	..

Sixteen Gunboats (*Staunch class*) of 268 tons, and of 100 to 171 H.P.; also *five small gunboats*, of 210 tons, and 124 to 174 H.P., and *one steel gunboat* of 108 tons and 172 I.H.P. The new programme provides for the building of *twenty-two gun vessels* and despatch boats for the defence of the Zuyder Zee and Hollandisch Diep.

NORWAY.—Armoured Ships.

Class.	NAME	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.	in.			knots.	tons.	
c.s., t.	Mjölner	I.	1515	203	5	45	11	11	10	1	450	Norrkoping	1868	66,800	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.*	..	8·0	138	80
t.	Two new vessels †	S.	3403	274	6	48	6	17	0	2	3700	Germany	Bldg	190,000	..	..	..	2 9·8-in., 4 4·7-in. Q.F., 16 smaller	..	16	..	..
c.s., t.	Skorpionen	I.	1447	200	2	45	11	11	6	1	350	Horten	1866	..	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.*	..	6·0	138	80
,,	Thor	I.	2003	203	5	49	3	13	2	1	600	Horten	1872	..	7	14¼	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.*	..	8·0	200	90
,,	Thrudvang	I.	1515	200	2	45	11	11	10	1	500	Horten	1867	..	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.*	..	8·0	138	80

* New armament, as given, provided for in the budget of 1895–96.

† Svea type (see Sweden). Provision made in budget of 1895–96.

Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
g.b.	Æger	S.	393	108	6	29	6	8	0	2	450	Horten	1892	..	..	1½	1 8·2-in., 1 2·7-in. Q.F., 2 1·9-in.	..	9·0	..	..
g.v.	Ellida	W.	1000	187	0	32	8	14	4	2	900	Horten	1880	..	..	..	5 5·9-in. 4-ton (Krupp), 1 4·7-in., 1 l., 2 M.	1	12·0	97	128
,,	Frithjof	S.	1371	216	6	32	10	13	3	2	300	..	Bldg.	..	..	..	2 4·7-in. 4 2·9-in. Q.F., 4 1·4-in., 2 l.	3 (1 sub.)	..	..	..
,,	Heimdal	S.	630	167	3	26	9	11	8	1	700	Christiania	1892	..	..	..	4 2·5-in. Q.F.	..	12·0	22	..
corv.	Nord Stjernen	W.	1609	216	6	39	4	17	9	1	800	Horten	1862	..	..	..	6 6·2-in. 8-ton M.L.R., 10 8-in. smooth-bore, 3 l.	..	9·0	195	216
g.v.	Sleipner	I.	580	173	10	25	11	9	6	2	800	Horten	1877	..	..	..	1 10·2-in. 22-ton (Krupp), 1 5.9-in. 4-ton do., 1 M.	1	12·0	80	87
,,	Viking	S.	1113	203	6	30	6	13	0	2	2000	Horten	1891	..	..	1½	2 5·9-in., 4 2·5-in. Q.F., 4 1·4-in., 2. M.	3	15·0	140	..

Eleven Gunboats, of 189 to 280 tons, and of 180 to 450 I.H.P., armed with one large gun and machine guns in each.
Sixteen smaller Gunboats, of 60 tons, 70 I.H.P., and 7½ knots speed; each armed with one 5½-inch gun. Also several smaller gunboats

PORTUGAL.—Armoured Ship.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Battery.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots	tons.	
c.b.	Vasco da Gama	I.	2422	200 0	40 0	18 0	2	3600	Blackwall	1876	132,000	9	10	3	2 10·2-in. 18-ton (Krupp), 1 5·9-in., 2 2·5-in., Q.F., 2 M.	..	13·2	280	218

Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
cr.	Adamastor	S.	1750	250 0	35 0	14 0	2	4000	Leghorn	Bldg.	..	5	..	2 5·9-in. Q.F., 4 4·7-in., 2 2·2-in., 4 M.	3	17·5	..	..
corv.	Affonso de Albuquerque	I. & W.	1111	203 0	33 0	13 6	1	1360	Blackwall	1884	56,500	..	..	2 6-in. (Armstrong), 5 4·7-in. 2 2·5-in. Q.F., 2 M.	..	13·3	140	183
"	Bartholomeu Dias	W.	2377	207 0	37 5	20 6	1	400 (nom.)	Blackwall	1858	..	..	..	8 5-in.	..	10·0	360	271
g.v.	Bengo	I. & W.	462	125 6	24 6	9 0	1	400	Birkenhead	1879	22,500	..	..	1 6-in., 2 3·4-in.	..	10·0	80	88
"	Diu	W.	729	147 0	27 6	13 0	1	700	Lisbon	1889	..	..	..	1 5·9-in. (Krupp), 2 4 7-in., 1 3 pr. Q.F., 2 M.	..	12·0	80	114
"	Dom Luiz I.	S.	721	..	..	..	2	..	Lisbon	1891	..	..	..	4 4·1-in., 3 2·5-in. Q.F., 3 M.	..	11·0	100	..
"	San Salvador	S.	600	..	..	..	2	..	Lisbon	Bldg.	..	..	..	4 4·1-in., 3 5·2-in. Q.F., 3 M.	..	11·0	100	..
"	Douro	W.	587	142 9	26 0	11 0	1	400	Lisbon	1873 1877	..	..	..	1 5·9-in. 4-ton, 2 4·7-in., 1 M.	..	10·0	85	107

PORTUGAL.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
corv.	Duque da Terceira (training)	W.	1430	179 6	34 0	15 6	1	660	Lisbon	1864	..	..	..	2 4·7-in., 2 2·5-in. Q.F., 1 M.	..	9·0	130	178
g.v.	Liberal	I. shd.	580	140 0	25 6	10 6	1	580	Birkenhead	1884	32,500	..	..	1 6-in. 4-ton (Armstrong), 3 4-in., 2 M.	..	11·0	90	109
corv.	Mindello	C.	1124	170 0	35 9	14 0	1	900	Blackwall	1876	74,500	..	..	2 7-in. 4-ton M.L.R. (Armstrong), 4·47-in. 2 M.	..	11·5	130	169
g.v.	Mandovi	I. shd.	462	125 6	24 6	9 0	1	400	Birkenhead	1879	22,500	..	..	1 5·9-in., 2 3·4-in., 2 M.	..	10·0	80	86
"	Quanza	W.	587	142 9	26 0	11 0	1	500	Lisbon.	1877	..	..	..	1 5·9-in. 4-ton, 2 4·7-in., 1 M.	..	10·0	85	107
corv.	Rainha de Portugal	C.	1124	170 0	35 9	14 0	1	900	Blackwall	1876	74,500	..	..	2 7-in. M.L.R. (Armstrong), 4 4·7-in., 2 M.	..	11·5	130	169
g.v.	Rio Ave	W.	378	120 0	22 0	10 6	1	180	Lisbon.	1880	..	..	..	1 4·7-in. (Armstrong), 2 3-in.	..	8·0	60	90
"	Rio Lima	I. shd.	638	148 6	27 6	10 6	1	500	Birkenhead	1875	33,000	..	..	1 7-in. 4-ton (Armstrong), 4 4-in., 2 M.	..	11·0	100	109
"	Sado	C.	645	148 6	28 0	10 6	1	500	Birkenhead	1875	35,500	..	..	1 7-in. 4-ton (Armstrong), 4 4·7-in., 1 M.	..	11·0	100	109
"	Tamega	C.	645	148 6	28 0	10 6	1	500	Birkenhead	1875	35,500	..	..	1 7-in. 4-ton (Armstrong), 4 4·7-in., 1 M.	..	11·0	100	109
"	Tejo	W.	587	142 9	26 0	11 0	1	400	Lisbon.	1869	..	..	..	1 5·9-in. 4-ton, 2 4·7-in.	..	10·0	85	107
"	Vouga	W.	730	160 9	27 6	12 0	1	600	Lisbon	1882	..	..	..	4 4-in., 2 1·8-in. Q.F., 2 M.	..	10·0	100	109
"	Zaire	I. shd.	580	140 0	25 6	10 6	1	580	Birkenhead	1884	32,500	..	..	1 6-in. (Armstrong), 3 4-in. 2 M.	..	11·0	90	109
"	Zambeze	W.	641	143 0	25 9	12 0	1	500	Lisbon.	1886	..	..	..	1 6-in. (Armsg.), 2 4-in., 2 M.	..	10·0	85	107
cr.	Protected Cruiser (not named) 9 de Julio type)	S. shd.	3500	..	..	..	..	14,000	..	Projctd.	..	..	..	..	..	22·0	..	..

Ten small Gunboats (station and fiscal) and about 19 light draught steel river-gunboats.
One 22-knot Protected Cruiser of the Yoshino type, and Two Torpedo Gunboats of the Onyx type have been ordered from the Thames Ironworks, at Blackwall.

RUSSIA.—Armoured Ships.

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
c.d.s., t.	Adm. Chichagoff	I.	3493	254 0	42 7	18 0	1	2060	St. Petersburg	1868	..	6	6	..	2 11-in. 28-ton, 4 4-pr., 6 Q.F., 4 l.	..	10·5	300	264
”	Adm. Greig	I.	3462	254 0	42 7	17 6	1	2031	St. Petersburg	1868	..	4½	6	..	3 11-in. 28-ton, 6 Q.F., 2 l.	..	10·0	300	280
”	Adm. Lazareff	I.	3462	254 0	43 0	17 6	1	2004	St. Petersburg	1867	..	4½	6	..	3 11-in. 28-ton, 6 Q.F., 4 l.	..	0·25	300	280
a.c.	Adm. Nachimoff	S. shd.	7782	333 0	61 0	25 0	2	8000	St. Petersburg	1885	572,000	10 comp.	8 comp.	3	8 8-in., 10 6-in., 10 Q.F., 4 3-pr., 6 M.	4	16·7	1200	567
c.d.s.	Adm. Oushakoff	S.	4126	265 0	52 6	17 0	2	5000	St. Petersburg	1893	410,000	10	7-8	3	2 9-in., 4 6-in. Q.F., 6 1·8-in. Q.F., 8 M.	4	16·0	400	318
”	Adm. Seniavin	S.	4126	265 0	52 6	17 0	2	5000	St. Petersburg	1894	410,000	10	7-8	3	2 9-in., 4 6-in. Q.F., 6 1·8-in., 8 1·4-in., M.	4	16·0	400	318
c.d.s., t.	Adm. Spiridoff	I.	3493	254 3	42 7	19 1	1	2007	St. Petersburg	1868	..	6	6	..	2 11-in. 28-ton, 4 4-pr., 6 Q.F., 4 l.	..	10·5	300	260
b.	Alexander II.	S. shd.	8440	326 0	67 0	23 0	2	8000	St. Petersburg	1887	..	14 comp.	10 comp.	2½	2 12-in. 50-ton, 4 9-in. 19-ton, 8 6-in., 4 6-pr. Q.F., 4 3-pr., 6 M.	5	16·5	1200	604
b. 1st class.	Catherine II. (B.S.)	I. & S.	10,180	331 0	69 0	26 6	2	10,600	Nicolaieff	1886	900,000	16 comp.	14 comp.	3	6 12-in. (56-ton), 7 6-in., 8 6-pr. Q.F., 6 M.	7	15·5	886	325
c.d.s., t.	Charodeika	I.	1881	206 9	42 7	10 6	2	786	St. Petersburg	1867	..	4½	6	1	4 9-in., 2 Q.F. and 2 M.	..	8·0	250	171
b.	Sissoi Veliky (Sissoi the Great)	S.	8880	341 0	66 6	24 0	2	8500	St. Petersburg	1894	796,333	15¾ comp.	15¾ comp.	3	4 12-in., 6 6-in. Q.F., 12 1·8-in., 4 1·4-in., 2 M.	6	16·0	550	..

RUSSIA.—Armoured Ships—*continued.*

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Belt.	Armour: Gun Position	Armour: Deck Plating.	Armament: Guns. B.L.R. are of Russian Krupp pattern.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.					£	inches.	inches.	inches.			knots.	tons.	
a.c.	Dmitri Donskoi	S. shd.	5893	296 5	52 0	24 4	2	7000	St. Petersburg.	1883	..	6	unard.	2½	2 8-in., 4 6-in. Q.F., 10 4 7-in. Q.F., 16 Q.F. and M.. 4 l.	4	16·5	400	551
t.	Dvenadzat Apostoloff (Twelve Apostles) B.S.	S.	8076	330 0	60 0	25 6	2	11,500	Nicolaieff	1890	..	14 *comp.*	12 *comp.*	2½	4 12-in. 52-ton, 4 6-in., 8 3-pr. Q.F., 10 M.	6	16·6	800	500
t.	Gangoot	S.	6592	278 0	62 0	21 0	2	8300	St. Petersburg	1890	..	16 *comp.*	7·8	2½	1 12-in., 4 9-in., 4 6-in., 10 Q.F.	5	14·7	500	528
a.c.	General Admiral	I. shd.	4604	285 5	49 3	21 0	1	4472	St. Petersburg	1873	..	6	..	..	6 8-in., 2 6-in., 10 Q.F. and M., 5 l.	4	14·2	1000	312
c.d.s.	General Admiral Apraxine	S.	4126	265 0	52 6	17 0	2	5000	St. Petersburg (New Admiralty)	Bldg.	..	10	7·8	3	2 9-in., 4 6-in., 6 1·8-in. Q.F., 8 1·4-in.	4	16·0	215	318
a.c.	Gerzog Edinburgski	I. & W.	4604	285 5	49 3	21 0	1	5222	St. Petersburg	1875	..	6	6	..	4 8-in., 5 6-in., 12 Q.F., 6 l.	2	15·2	1000	500
b.	Georgi Pobiedonosetz (George the Victorious) B.S.	S.	10,280	320 0	69 0	26 7	2	10,600	Sebastopol	1892	431,000	16	12	..	6 12-in. 56-ton, 7 6-in. Q.F., 8 3·9-in., 6 M.	7	16·5	700	500
a.g.b.	Gremiastchy	S.	1500	225 0	41 0	11 0	2	2000	St. Petersburg	1892	..	5	..	1½	1 9-in., 1 6-in., 10 Q.F.	2	15·0	100	142
,,	Grozjastchy	S.	1492	229 0	41 8	11 0	2	2000	St. Petersburg	1890	..	5	..	1½	1 9-in., 1 6-in., 8 Q.F.	2	15·0	100	120
,,	Khrabry	S.	1492	229 0	41 7	11 0	2	2000	St. Petersburg (New Admiralty)	1895	..	5	..	1½	1 9-in., 1 6-in., 8 Q.F.	2	15·0	100	120
c.b.	Kniaz Pojarski	I.	5007	272 4	49 3	23 11	1	2835	St. Petersburg	1867	..	4½	4½	..	2 8-in., 2 6-in., 10 Q.F. and M., 4 l.	..	11·0	600	452
c.d.s., br.	Kreml	I.	3480	219 10	52 5	15 0	1	2822	St. Petersburg	1864	..	4½	4½	..	8 8-in., 6 6-in., 5 Q.F., 6 l.	..	9·0	..	63
1st cl.*a.c.*	Minin	I.	5740	298 6	49 3	25 3	1	5290	St. Petersburg	1878 altd.	..	7	8	..	4 8-in., 12 6-in., 16 Q.F., 4 l.	..	14·0	1200	450
c.d.s., br.	Netron-Menya	I.	3494	219 10	53 0	15 6	1	2393	St. Petersburg	1864	..	4½	4½	..	14 8-in., 4 Q.F., 2 M., 4 l.	1	9·0	500	63
t.	Navarin	S.	9476	338 0	67 0	25 0	2	9000	St. Petersburg	1891	772,995	16	12	..	4 12-in. 52-ton, 8 6-in., 14 Q.F. 4 l.	6	16·0	1200	..
t.	Nicolai I.	S. shd.	8440	326 0	67 0	23 0	2	8000	St. Petersburg	1888	453,000	14 *comp.*	10 tur. 6-in. b. *comp.*	2½	2 12-in. 52-ton, 4 9-in. 19-ton, 8 6-in., 12 Q.F., 8 M., 4 l.	6	14·8	..	604
cir. c.d.s.	Novgorod, B.S.	I. shd.	2706	101 0	101 0	13 0	6	2000	Nicolaieff	1873	..	9–7	9	..	2 11-in., 8 Q.F., 2 M., 2 l.	..	6·0	200	150
t.	Oslabya	S.	12,674	402 0	70 6	26 0	3	14,500	St. Petersburg (New Admiralty)	Bldg.	..	9	(?)	(?)	34 guns	(?)	17·5	..	..
a.g.b.	Otvazny	S.	1500	225 0	41 0	11 0	2	2000 2589 (*t*)	St. Petersburg	1892	..	5	..	1½	1 9-in., 1 6-in., 10 Q.F.	2	15·0 15.5 (*t*)	100	142
1st cl.*a.c.*	Pamyat Azova	S. shd.	6000	377 0	51 0	23 0	2	8000	St. Petersburg	1888	350,000	9 *comp.*	8 *comp.*	2½	2 8-in., 13 6-in., 14 Q.F., and 3 M.	7	18·8	1000	525
t.	Peresviet	S.	12,674	402 0	70 6	26 0	3	14,500	St. Petersburg	Bldg.	..	9	(?)	(?)	34 guns	(?)	17·5	..	..
c.d.s., br.	Pervenetz	I.	3279	219 10	52 5	14 9	1	1067	Blackwall	1863	..	4½	4½	..	6 8-in., 9 6-in., 7 Q.F., 8 l.	..	9·0	..	63
t.	Peter Veliky	I.	8749	328 2	62 4	23 9	2	8258	St. Petersburg	1872	..	14–8	8·6	3	4 12-in. 40-ton, 13 Q.F., 4 l.	1	14·5	1200	436
t.	Petropavlovsk	S.	10,960	367 6	69 0 70 0	26 0	2	10600	St. Petersburg	1894	1,098,000	15¾	10 H. S.	3½	4 12-in., 8 8-in., 24 Q.F.*	6	17 5	900	..
t.	Poltava	S.	10,960	367 6	69 0	26 0	2	10,600	St. Petersburg	1894	1,098,000	15¾	10 H. S.	3½	4 12-in., 8 8-in., 24 Q.F.*	6	17·5	900	..
a. c.	Rossia	S.	12,130	480 0	68 6	25 0	3	18,000	St. Petersburg	Bldg.	..	10	..	2½	4 8-in., 16 6-in., 6 4·7-in. Q.F., 18 small Q.F. & M.	5	20·0	2500	725
t.	Rostislav, B.S.	S.	8880	341 0	66 6	24 0	2	8,500	Nicolaieff	Bldg.	..	15¾ *comp.*	15¾ *comp.*	..	4 10-in., 8 5·9-in. (Canet), 12 1·8-in. Q.F., 4 1·5-in., 2 M.	6	16·0	550 800	..
a. c.	Rurik	S.	10,923	396 6	67 0	26 0	2	13,250	St. Petersburg	1894	..	10 *comp.*	..	2½	4 8-in., 16 6-in., 6 4·7-in. Q.F., 18 small Q.F. & M.	5	18·0	2000	768

* 12 6-in. Q.F. will probably be substituted for the 8 8-in. guns.

(*t*) On trial.

RUSSIA.—Armoured Ships—*continued.*

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	ins.			knots.	tons.	
t.	Sevastopol . . .	S.	10,960	367 6	69 0	26 0	2	13600	St. Petersburg .	1895	1,098,000	$15\frac{3}{4}$	10 H. S.	$3\frac{1}{2}$	4 12-in., 8 8-in., 24 Q.F.* .	6	17·5	900	..
b.	Sinope, B.S. . .	I. & S.	10,180	331 0	69 0	26 6	2	13000	Sebastopol .	1887	900,000	16 *comp.*	14 *comp.*	3	6 12-in. 50-ton, 7 6-in. 8 Q.F., 6 M.	7	16·75	886	325
b.	Tchesmé, B.S. . .	I. & S.	10,180	331 0	69 0	26 6	2	11000	Sebastopol .	1886	900,000	16 *comp.*	14 *comp.*	3	6 12-in. 50 ton, 7 6-in., 8 Q.F., 6 M.	7	15·0	886	325
"	Tria Sviatitelia, B.S. . (Three Saints.)	S.	12,480	357 6	72 2	27 0	2	10600	Nicolaieff .	1893	..	18–16	16	3	4 12-in., 12 6-in. Q.F., 4 4-in., 4 7-in., 56 smaller Q.F. & M.	6 2 sub.	16·0	1000	582
circular c.d.s.	Vice-Admiral Popoff, B S.	I. shd.	3590	120 0	120 0	13 5	6	3066	Nicolaieff .	1875	..	16	16	..	2 12-in. 40-ton, 2 Q.F., 6 l. .	..	8·0	250	453
a.c.	Vladimir Monomach	S. shd.	5796	296 6	52 0	24 0	2	7000	St. Petersburg .	1882	..	6 *comp.*	..	2	4 8-in., 12 6-in., 18 Q.F. & M., 4 l.	2	15·2	400	550

* 12 6-in. Q.F. will probably be substituted for the 8 8-in. guns.

Ten old Monitors of 1566 tons have been removed from this list:—Uragan, Tifon, Striletz, Edinorog, Koldun, Lava, Bronenosetz, Latnik, Perun, and Vieschun; and one of 1461 tons—Smerch.

RUSSIA.—Cruising Ships, &c.

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons	ft. in.	ft. in.	ft. in.	no.				£		ins.			knots.	tons.	
2nd cl. cr.	Admiral Korniloff*	S. & W.	5000	351 0	48 6	20 0	2	9000	St. Nazaire	1887	296,000	..	2½	2 8-in., 14 6-in., 6 1·8-in. Q.F., 6 1·4-in., 5 l.	6	17·5	1100	425
3rd cl. cr.	Afrika	I.	2852	285 5	39 4	17 1	1	1350	Chester, U.S.	1877	..	..	..	3 6-in., 6 Q.F., 4 M., 4 l.	..	13·0	975	257
3rd cl. cr.	Asia	I.	2483	269 0	36 0	16 5	1	1100	Philadelphia	1878	..	..	..	2 6-in., 5 Q.F., 6 M., 5 l.	..	13·0	750	260
g.v.	Bobr	S.	950	187 0	35 2	9 6	2	1150	Kretona	1884	43,000	..	..	1 9-in., 1 6-in., 5 Q.F., M., & 6 l.	..	12·0	..	..
to.g.b.	Captain Sacken, B.S.	S.	700	210 0	24 0	8 10	2	3400	Nicolaieff	1888	40,700	..	..	7 4·7-in. Q.F., 7 M.	6	18·5	97	120
g.v.	Chernomoretz, B.S.	S.	1224	210 0	35 0	11 1	1	2000	Nicolaieff	1889	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161
"	Coreetz	S.	1213	206 0	35 0	10 6	2	1500	Stockholm	1886	..	..	1½	2 8-in., 1 6-in., 2 Q.F., 4 l.	2	13·5	..	..
corv.	Djigit	I. & W.	1456	206 9	32 10	16 1	1	1700	St. Petersburg	1876	..	..	..	3 6-in., 8 Q.F. & M., & 4 l.	..	13·0	250	172
"	Donetz, B.S.	S.	1224	210 0	35 0	11 0	1	2000	Nicolaieff	1887	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161
to.g.b.	Gaidamak	S.	500	192 6	24 2	7 6	2	3000	Abo	1893	..	..	..	2 1·8-in. Q.F., 7 1·4-in., 10 M.	3	22·0	90	87
to.g.b.	Griden, B.S.	S.	400	192 6	24 2	7 6	2	3500	..	1893	66,600	..	..	2 1·8-in. Q.F., 7 1·4-in., 10 M.	3	22·0	90	60
g.v.	Jermak	I.	706	154 3	26 3	11 2	1	125	St. Petersburg	1870	..	..	..	2 guns	..	..	..	..
to.g.b.	Kazarsky, B.S.	S.	411	190 0	24 0	8 6	2	3400	Elbing	1890	32,500	..	..	9 1·8-in. Q.F. (Hotchkiss)	2	21·0	90	60
corv.	Kreyzer	I. & W.	1542	206 9	32 10	16 1	1	1800	St. Petersburg	1875	..	..	..	2 6-in., 7 Q.F., 1 M., 4 l.	..	13·0	..	..
g.v.	Kubanetz, B.S.	S.	1224	210 0	35 0	11 0	1	1500	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F.	2	13·8	250	161
to.g.b.	Lieutenant Ilyen	S.	600	230 0	24 0	8 10	2	3500	St. Petersburg	1887	40,150	..	..	7 3-pr. Q.F., 10 M.	7	20·1	97	120
g.v.	Mandjur	S.	1224	210 0	35 0	11 0	2	1400	Copenhagen	1886	..	..	1½	2 8-in., 1 6-in., 7 Q.F., M., & 4 l.	2	14·0	..	..
corv.	Nayezdnik	I. & W.	1334	206 9	32 10	14 0	1	1719	St. Petersburg	1878	..	..	..	3 6-in., 7 Q.F. & M., 4 l.	..	13·0	250	172

* New boilers 1895.

RUSSIA.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
corv.	Oprichnik	S.& W.	1426	206 9	32 10	14 0	1	1268	St. Petersburg	1880	..	..	..	3 6-in., 7 Q.F. & M., 4 l.	..	13·0	230	172
2nd cl. cr.	Pamyat Merkuriya, B.S.	I. & S.	3050	295 0	41 0	17 0	1	3000	Toulon	1880	..	..	..	6 6-in., 8 Q.F. & M., 4 l.	2	16·0	1100	200
sl.	Plastun	I. & W.	1255	206 9	32 10	14 0	1	1268	St. Petersburg	1879	..	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
to.g.b.	Posadnik	S.	400	192 6	24 2	7 6	2	3000	Elbing	1892	111,000	..	..	2 1·8-in. Q.F., 7 1·4-in., 3 M.	3	22·0	90	87
corv.	Razboynik	I. & W.	1329	206 9	32 10	14 0	1	1786	St. Petersburg	1878	125,000	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
3rd cl. cr.	Rynda	S. shd.	2950	265 9	45 11	16 1	2	3000	St. Petersburg	1885	..	..	1½	10 6-in., 9 Q.F., M., & 4 l.	4	14·8	710	322
g.v.	Sivootch	S.	950	187 0	35 0	9 6	2	1125	Stockholm	1884	43,000	...	..	1 9-in., 1 6-in., 5 Q.F., M., & 6 l.	..	12·5	..	..
corv.	Strjelok	I. & W.	1343	206 9	32 10	14 0	1	1528	St. Petersburg	1880	..	..	..	3 6-in., 7 Q.F., M., & 4 l.	..	13·0	250	172
cr.	Svietlana	S.	3828	331 3	42 8	18 9	2	3828	Havre	Bldg.	..	..	2	6 5·9 Q.F. (Canet), 10 1·8-in.	4	20·0	1000	..
g.v.	Teretz, B.S.	S.	1224	210 0	35 0	11 0	..	1500	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·8	250	161
"	Uraletz, B.S.	S.	1224	210 0	35 0	11 0	..	1500	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·8	250	161
to.g.b.	Voevoda	S.	400	192 6	24 2	7 6	2	3000	Elbing	1892	111,000	..	..	2 1·8-in. Q.F., 7 1·4-in., 3 M.	3	22·0	90	87
sl.	Vjestnik	I. & W.	1255	206 9	32 10	14 2	1	1268	St Petersburg	1879	..	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
to.g.b.	Vzadnidk	S.	500	192 6	24 2	7 6	2	3000	Abo	1893	..	..	..	4 1·8-in. Q.F., 7 1·4-in. 10 M. & 1.	3	22·0	250	172
sl.	Zabiyaka	I.	1234	219 10	29 6	14 9	1	1194	Philadelphia	1878	..	..	..	6 Q.F., 4 M., 5 l.	..	14·5	90	87
g.v.	Zaporojetz, B.S.	S.	1200	210 0	35 0	10 0	2	1500	Nicolaieff	1887	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161
2nd cl. cr.	Two New	S.	..	..	..	..	..	6000	Galerny Ostrov	Pro.	..	..	..		..	..	..	..
g.v.	New	S.	903	200 0	37 0	..	..	1000	St. Petersburg	Bldg.	..	..	..		..	12·0	..	..

Baltic:—*Ten Gunboats, Staunch Class*, of 270 to 402 tons, 195 to 445 I.H.P., with 1 11-inch breech-loader, and 9 knots speed, and *two Gunboats* of about 180 tons and 7 knots speed. *Training Ships*, Bajan, Voin, Vierny (launched at the Baltic Works, St. Petersburg, November, 1895), and Moriak. *Imperial Yachts*, Standart, Polarnaia Svezda, Tsarevna, &c. Black Sea:—*Twelve Steamers (Gun-vessels, Despatch-vessels, &c.)* 90 to 298 tons.

Auxiliary Steamers.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Complement.
	BLACK SEA CO.		tons.	ft. in.	ft. in.	ft. in.					
Auxiliary Cruiser	Czar	S.	2340	319 0	37 0	23 6	1	350 nom.	Newcastle	1883	14
,,	Czarevna	,,	2340	319 0	37 0	23 6	1	350 nom.	,,	1883	14
,,	Czaritza	,,	2340	319 0	37 0	23 6	1	350 nom.	,,	1883	14
,,	Grand Duke Alexis	,,	2350	284 0	37 0	14 9	1	3500	Hebburn	1890	16
,,	Grand Duke Constantine	,,	2400	284 0	37 0	15 0	1	3500	,,	1891	16
,,	Grand Duke No. 1	,,	2400	288 0	37 0	15 0	1	2500	,,	Bldg.	14½
,,	Grand Duke No. 2	,,	2400	288 0	37 0	15 0	1	2500	,,	,,	14½
,,	Emperor Nicolas II.	,,	..	..	..	..	..	..	,,	1895	..
,,	Roumantzeff	,,	760	212 0	28 0	7 6	2	1000	,,	1894	13
	VOLUNTEER FLEET.										
,,	Dniester (late Rossia, was Holsatia)†	I.	3100	341 0	40 0	21 0	1	2200	,,	1868	14
,,	Ekaterinoslav *	,,	..	..	..	..	..	..	,,	1895	..
,,	Khabarovsk	,,	2700	265 0	36 0	14 6	2	1800	,,	1894	13
,,	Kherson	,,	10,255	493 0	54 0	24 0	2	12,500	,,	1895	19½
,,	Kiev *	,,	5000	..	..	..	..	..	..	Bldg	..
,,	Kostroma	,,	6830	360 0	42 0	23 6	1	2700	,,	1888	14
,,	Nijni Novgorod	,,	3130	325 0	40 0	..	..	2000	Elswick	1891	11½
,,	Orel	,,	7650	445 0	48 0	23 6	2	10,000	Hebburn	1889	19
,,	Petersburg	,,	9250	460 0	52 0	24 0	2	11,000	,,	1894	19
,,	Pruth (late Moskva, was Kinfauns Castle)†	,,	3050	360 0	43 0	24 0	1	2730	Glasgow	1879	14
,,	Saratoff	S.	8750	460 0	50 0	24 0	2	10,000	,,	1892	19
,,	Tamboff	,,	4360	385 0	45 0	24 6	2	..	Dumbarton	1893	12¾
,,	Vladimir	,,	..	419 0	49 6	24 0	2	..	,,	1895	12
,,	Voronesh	,,	..	419 0	49 6	24 0	2	..	,,	1895	12
,,	Yaroslav	,,	4321	385 0	45 0	24 6	2	..	,,	1893	12¾

* In hand at Clydebank and Hebburn. Others projected.

† Now training ships in the Black Sea.

SPAIN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	ins.	ins.			knots.	tons.	
a.c.b.	Almirante Oquendo .	S.	7000	340 0	65 0	21 6	2	13,000	Bilbao .	1891	600,000	12	10½	3	2 11-in., 10 5·5-in. (all Hontoria), 8 2·2-in. Q.F., 8 1·4-in., 2 M.	6	20·0	1200	500
„	Cardenal Cisneros .	S.	7000	347 10	61 0	21 10	2	15,000	Ferrol .	Bldg.	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	8	20·0	1200	500
„	Cataluña . . .	S.	7000	347 10	61 0	21 10	2	15,000	Carthagena .	Bldg.	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	8	20·0	1200	484
a.c.t.	Emperador Carlos V.	S.	9090	380 0	67 0	25 0	2	18,500	Cadiz .	1895	734,000	2	10	6⅝	2 11-in. (Hontoria), 8 5·5-in. Q.F., 4 3·9-in., 2 2·7-in., 4 2·2-in. and 4 11.4-in., 2 M.	6	20·0	1700	535
a.c.b.	Infanta Maria Teresa	S.	7000	340 0	65 0	21 6	2	13,758	Bilbao .	1890	600,000	12	10½	3	2 11-in., 10 5·5-in. (all Hontoria), 8 2·2-in. Q.F., 8 11·4-in., 2 M.	6	20·25	1200	500
br.	Numancia (*a*) . .	I.	7305	314 10	55 9	25 3	1	3708	La Seyne .	1863	315,600	5½	5	..	8 10-in. M.L.R. (Armstrong), 7 8-in., 1 7·8-in. (Hontoria), 8 M., 3 l.	2	8·0	1100	600
b.	Pelayo . . .	S.	9900	330 0	66 0	24 11	2	8000	La Seyne .	1887	..	17¼	19¼	4	2 12-5-in. 48-ton, 2 11-in. 38-ton, 1 6·2-in., 12 4·7-in., 6 Q.F. 12 M.	7	16·0	800	600
a.c.b.	Princesa de Asturias	S.	7000	347 10	61 0	21 10	2	15,000	Carraca .	Bldg.	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	8	20·0	1200	500
c.s., t.	Puig-cerda. (Monitor) (torpedo training)	I.	553	127 11	29 6	6 7	2	328	Sa Seyne .	1874	..	4	4	9	1 6·2-in. (Palliser), 2 4·7-in. bronze zmooth bores.	..	8·0	23	..
a.c.b.	Vizcaya . . .	..	7000	340 0	65 0	21 6	2	13,000	Bilbao .	1891	600,000	12	10½	3	2 11-in., 10 5.5-in. Q.F., 2 2·7-in., 8 12·2-in., 4 1·4-in. 2 M.	6	20 0 21.0 (*t*)	1200	500
b.r.	Vitoria (training) .	I.	7250	318 3	55 10	25 3	1	4500	Blackwall .	1865	..	5½	5	..	8 9-in. M.L.R. (Armstrong), 3 8-in., 1 7·8-in. (Hontoria), 8 M., 2 l.	2	11·0	875	561

(*a*) To be used as a transport.

(*t*) On trial.

SPAIN.—Cruising Ships.

lass.	NAME.	Material.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tub's.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£		ins.			knots.	tons.	
cr.	Alfonso XII. (a)	S.	3090	278 10	42 7	16 5	1	4800	Ferrol	1887	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in. 6 6-pr. Q.F., 4 3-pr., 5 M.	5	17·5	600	300
"	Alfonso XIII.	S.	5000	318 6	50 6	20 0	2	11,000	Ferrol	1891	..	..	4½	4 7·8-in. (Hontoria), 6 4·7-in., 6 2·2-in. Q.F., 6 1·4-in., 3 M.	5	20·0	1200	276
"	Aragon	W.	3342	246 0	45 11	20 11	1	4400	Carthagena	1879	..	..	..	6 6·2-in. (Hontoria), 2 3·3-in. (Krupp), 4 2·9-in., 2 M.	2	14·0	470	300
"	Castilla	W.	3342	246 0	45 11	20 11	1	4400	Cadiz	1881	..	..	..	4 5·9-in. (Krupp), 2 4·7-in., 2 3·3-in., 4 2·9-in., 8 Q.F., 2 M.	2	14·0	470	300
"	General Concha	I.	524	157 5	25 7	8 7	2	600	Ferrol	1883	..	..	..	3 4·7-in. (Hontoria), 2 Q.F., 1 M.	1	11·5	80	93
	Conde de Venadito	I.	1130	210 0	32 0	12 6	1	1600	Carthagena	1888	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 2 Q.F., 5 M.	2	14·0	220	130
"	Cristobal Colon *	I.	1130	210 0	32 0	12 6	1	1600	Cadiz	1887	..	..	..	4 4·7-in. (Hontoria), 1 2·7-in., 2 Q.F., 5 M.	2	14·0	220	..
to.g.b.	Don Alvaro de Bazan	S.	830	235 0	..	..	2	..	Ferrol	Bldg	..	..	..	2 4·7-in. (Hontoria) Q.F., 4 1 5-in., 2 M.	4	20 0	..	110
cr.	Don Antonio de Ulloa	I.	1130	210 0	32 0	12 6	1	1600	Cadiz	1887	..	..	..	4 4·7-in. (Hontoria), 2 2 7-in., 2 Q.F., 5 M.	2	14·0	210	130
"	Don Juan de Austria	I.	1130	210 0	32 0	12 6	1	1600	Carthagena	1887	..	..	..	4 4·7-in. (Hontoria), 3 2·2-in. Q.F., 2 1·5-in., 5 M.	3	14·0	210	130
to. g. b.	Doña Maria de Molina	S.	830	235 0	..	..	2	..	Ferrol	Bldg	..	..	..	2 4·7-in. (Hontoria), Q.F., 4 1·5-in., 2 M.	4	20 0	..	110

(a) To be used as a Transport.

* Lost near Cape San Antonio, Cuba, October, 1895.

SPAIN.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	ins.	ins.			knots.	tons.	
to.g.b.	Destructor	S.	458	192 6	25 0	7 0	2	3800	Clydebank	1887	..	..	..	1 3·5-in., 4 6-pr. Q.F., 4 M.	3	22·56	104	55
g.v.	Elcano	I.	524	157 5	25 7	8 6	2	600	Carraca	1885	..	..	..	3 4·7-in. (Hontoria), 2 Q.F., 2 M.	1	11·5	80	116
d.v.	Fernando el Catolico (Torpedo training)	I.	500	157 5	25 7	8 5	2	550	La Seyne	1875	..	..	..	1 6·2-in. M.L.R. (Palliser), 2 4·7-in., smooth-bores, 1 M.	..	10·0	20	98
to.g.b.	Filipinas	S.	750	213 0	27 0	8 6	2	4600	Cadiz	1892	..	..	..	2 4·7-in. Q.F., 4 1·5-in., 4 M.	4	20·0	120	110
"	Galicia	S.	571	190 0	23 0	10 4	2	2600	Le Graña	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	19·0	106	80
g. v.	General Lezo	I.	524	157 5	25 7	8 6	2	600	Cathagena	1885	..	..	..	2 4·7-in. (Hontoria), 1 3·5-in., 2 Q.F., 1 M.	2	11·0	80	97
cr.	Infanta Isabel	I.	1130	210 11	32 2	12 5	1	1500	Cadiz	1885	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 3 Q.F., 4 M.	2	14·0	220	130
"	Isabel II.	I.	1130	210 11	32 2	12 5	1	1500	Ferrol	1886	..	..	..	4 4·7-in. (Hontoria), 2 7·7-in., 4 Q.F., 3 M.	2	14·0	220	130
"	Isla de Cuba	S.	1030	185 0	30 0	11 6	2	2200	Elswick	1887	..	..	2½	4 4·7-in. (Hontoria), 4 6-pr. Q.F., 2 3-pr, 2 M.	3	16·0	160	160
sl.	Isla de Luzon	S.	1030	185 0	30 0	11 6	2	2200	Elswick	1887	..	..	2½	4 4·7-in. (Hontoria), 46-pr. Q.F., 2 3-pr., 2 M.	3	16·0	160	160
"	Jorge Juan	W.	935	203 5	29 6	12 2	1	1100	La Seyne	1876	..	..	..	3 4·7-in. (Hontoria), 2 2·8-in. (Krupp), 2 M.	..	13·0	130	146
cr.	Lepanto	S.	4826	318 6	50 6	20 0	2	12,000	Carthagena	1892	..	..	4½	4 7·8-in. (Hontoria), 6 4·7-in. Q.F., 6 6-pr., 4 3-pr. 5 M.	5	20·0	1100	276
g.v.	Magellanes	I.	524	157 5	25 7	8 6	2	600	Cadiz	1885	..	..	..	3 4·7-in. (Hontoria), 3 M.	1	11·0	80	97
to.g.b.	Marques de la Victoria	S.	830	235 0	..	..	2	..	Ferrol	Bldg.	..	..	..	2 4·7-in. (Hontoria) Q.F., 4 1·5-in., 2 M.	4	20·0	..	110
cr.	Marques de la Ensenada	S.	1030	185 0	30 0	11 6	2	1600	Carraca	1890	..	..	2½	4 4·7-in (Hontoria), 5 Q.F., 4 M.	4	15·0	160	164
d.v.	Marques del Duero	I.	500	157 5	25 7	8 5	2	550	La Seyne	1875	..	..	..	1 6·2-in. M.L.R. (Palliser), 2 4·7-in. smooth-bores, 1 M.	..	10·0	90	98
to.g.b.	Marques de Molins	S.	571	190 0	23 0	10 4	2	2600	La Graña	1891	..	..	..	2 4·7in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	19·0	106	80
"	Martin Alonzo Pinzon	S.	571	190 0	23 0	10 4	2	2600	La Graña	1892	..							
cr.	Navarra	W.	3342	232 11	42 7	20 4	1	4400	Ferrol	1881	..	..	..	4 5 9-in., 2 4·7-in., 2 3·4-in., 4 2 9-in., 4 M.	2	14·0	470	300
"	Nueva Espana	S.	630	190 0	23 0	11 9	2	2600	Carraca	1889	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	18·0	106	91
to.g.b.	Rapido	S.	570	190 0	23 0	10 4	2	2600	Carraca	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	18·0	106	80
cr.	Reina Christina	S.	3520	282 2	42 7	16 5	1	3970	Ferrol	1886	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in., 3 2·2-in. Q.F., 2 1·5-in., 6 3-pr., 2 M.	5	17·5	600	370
"	Reina Mercedes	S.	3090	278 10	42 7	16 5	1	3700	Carthagena	1887	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in., 3 2·2-in. Q.F., 2 1·5.in., 6 1·4-in., 2 M.	5	17·5	600	375
sl.	Sanchez Barcaistegui *	W.	935	203 5	29 6	12 2	1	1100	La Seyne	1876	..	..	..	3 4·7-in. (Hontoria), 2 2·9in. (Krupp), 2 M.	..	13·0	130	..
to.g.b.	Temerario	S.	570	190 0	23 0	10 4	2	2600	..	1889	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	20·5	106	82
cr.	Velasco	I.	1152	209 11	29 3	12 5	1	1500	Blackwall	1881	..	..	..	3 5·9-in. 4-ton (Armstrong), 2 2·7-in. (Hontoria), 2 M.	..	14·3	220	173
to.g.b.	Veloz	S.	750	213 0	27 0	8 6	2	4500	..	Bldg.	..	..	..	2 5·9-in. (Hontoria), 4 2·2-in. Q.F., 4 M.	2	20·0	106	..
"	Vincente Yanez Pinzon	S.	571	190 0	23 0	10 4	2	2600	La Graña	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	19·0	106	80

* Lost at Havana in September, 1895.

Seven 1st class Gunboats, Hernan Cortez, Pizzaro, Vasco Nuñez de Balboa, Ponce de Leon, Velasquez, Alvarado, and Sandoval (300 tons), built for Cuba, 1895. Quiros (Philippines) 347 tons, launched 1895. Twenty-eight 2nd class Gunboats, 103 to 255 tons. Thirty-seven 3rd class Gunboats, of which eighteen built for Cuba, 1895.
A Cruiser and two Torpedo-destroyers have been ordered to replace the Reina Regente, Cristobal Colon, and Sanchez Barcaistegui.

SWEDEN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Backing. Deck Plating	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
a.g.b.	Berserk	I.	452	131 3	29 6	8 3	2	155	Norköping	1874	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
"	Björn	I.	457	131 3	26 3	8 3	2	155	Norköping	1874	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
"	Fenris	I.	259	104 11	22 4	7 10	1	44	Stockholm	1872	..	2	11	¾	1 9·4-in., 2 M.	..	6·0	7	30
"	Folke	I.	460	131 3	26 3	8 3	2	155	Norköping	1875	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
"	Gerda	I.	457	131 3	26 3	8 3	2	133	Stockholm	1873	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	Göta	S.	3135	258 6	48 0	16 0	2	4677	Gothenburg	1890	..	11½	11½–9¾	2	2 10-in., 4 6-in., 5 Q.F., 6 M.	3	15·96	200	150
a.g.b.	Hildur	I.	457	131 3	26 3	8 3	2	133	Stockholm	1872	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	John Ericsson	I.	1500	200 2	45 11	11 6	1	380	Norköping	1865	..	4½	11½	1	2 9·4-in., 2 M.	..	6·0	112	80
"	Loke	I.	1600	205 3	45 11	11 10	1	430	Norköping	1871	..	4½	18	1	2 9·4-in., 2 M.	..	7·0	112	75
"	Odin	S.	3400	270 4	47 10	16 6	2	3700	..	Bldg.	..	12	12	.. 2	2 9·8-in., 4 4.7-in., Q.F., 6 2 2-in., 10 M.	1	16·0	300	200
a.g.b.	Sköld	I.	247	104 11	22 4	8 3	1	17	Stockholm	1869	..	1	9	¾	1 9·4-in., 2 M.	..	4·0	5	39
"	Sölve	I.	454	131 3	29 6	8 3	2	155	Norköping	1875	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	Svea	S.	2900	249 4	49 3	15 9	2	3100	Gothenburg	1886	127,300	11½	11½	2	2 10-in. (Armstrong), 4 6-in., 4 l., 6 M.	3	15·45	200	268
t.	Thordön	I.	1500	200 2	45 11	11 6	1	380	Norköping	1866	..	4½	11½	1	2 9·4-in., 2 M.	..	6·0	112	80
c.d.s., t	Thule	S.	3135	249 4	49 3	15 9	2	3150	Stockholm	1892	..	11½–7¾	11½	2	2 10-in. (Armstrong), 4 6-in., 5 l., 6 M.	3	16·0	..	165
"	Tirfing	I.	1500	200 2	45 11	11 6	1	380	Norköping	1867	..	4½	11½	1	2 9·4-in., 2 M.	..	6·0	112	80
a.g.b.	Ulf	I.	457	131 3	26 3	8 3	2	155	Norköping	1873	18,000	2½	14	¾	1 9·4-in., 2 M.	..	8·0	20	45

Three armoured vessels, of *Odin* class, each of 3400 tons displacement and 3703 H.P., carrying 2 9·8-in. guns as their heaviest armament, are projected.

SWEDEN.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.									knots.	tons.	
corv.	Balder	W.	1886	203	5	36	0	18	4	1	1380	Carlskrona	1870	..	..	..	2 6-in. (Armstrong), 6 4·7-in., 2 l., 4 M.	..	12·0	200	218
g.v.	Blenda	I.	500	167	4	25	11	9	2	2	590	Gothenburg	1875	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	12·0	98	71
"	Disa	I.	500	167	4	25	11	9	2	2	590	Carlskrona	1877	..	..	..	1 6-in., 1 4·7-in., 2 l., 2 M.	..	12·0	98	72
tor. ship.	Drott (ex Ran)	I.	630	173	10	26	3	9	6	2	960	Stockholm	1877	..	..	..	4 Engström, Q.F.	3	13·0	100	..
g.v.	Edda	I.	640	180	5	27	3	9	6	2	960	Carlskrona	1882	..	..	..	1 10·6-in., 1 6-in., 2 l., 2 M.	..	13·0	80	76
corv.	Freja	S.& W.	2000	216	6	39	4	18	9	1	1750	Malmö	1885	..	..	..	5 6-in., 8 5-in., 4 l., 4 l.	..	12·0	180	250
to.g.b.	Orn	S.	700	..		..		..		..	4000	..	bldg	..	..	..	2 4·7-in. Q.F., 4 2·2-in.	1	19·0	..	..
g.v.	Rota	I.	537	170	7	26	3	9	2	2	780	Stockholm	1878	..	..	..	1 10 6-in., 1 4·7-in., 2 M.	..	13·0	80	72
corv.	Saga	W.	1535	200	2	32	10	17	1	1	900	Carlskrona	1878	..	..	..	1 6-in. (Armstrong), 6 4·7-in., 4 M., 2 l.	..	11·0	170	189
g.v.	Skäggald	I.	537	170	7	26	3	9	2	2	780	Stockholm	1879	..	..	..	1 6-in., 1 5-in., 2 M.	..	13·0	80	72
"	Skagul	I.	537	170	7	26	3	9	2	2	780	Stockholm	1878	..	..	..	1 6-in., 1 5-in., 2 M.	..	13·0	80	72
"	Skuld	I.	537	170	7	26	3	9	2	2	780	Carlskrona	1880	..	..	..	1 6-in., 1 5-in., 2 M.	..	13·0	80	72
"	Urd	I.	537	170	7	26	3	9	2	2	780	Malmö	1877	..	..	..	1 6-in., 1 5-in., 2 Q.F., 2 M.	..	13·0	80	71
"	Verdande	I.	537	170	7	26	3	9	2	2	780	Carlskrona	1879	..	..	..	1 6-in., 1 5-in., 2 M.	..	13·0	80	72

Four gunboats of 190 to 200 tons, and about 130 I.H.P. each, and carrying 1 5-in B.L.R. and 2 M.; also one gunboat of 280 tons and 440 H.P., armed with 4 quick-firing guns. Torpedo School-vessel, Ran, built of steel and of 175 tons displacement, 140 I.H.P. and 10 knots speed. A 19-knot gun vessel of 700 tons is building.

TURKEY.—Armoured Ships.

A number of ships in these lists have probably no fighting value, but trustworthy information is wanting.

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Maximum Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					inches.	inches.	inches.			knots.	tons.	
a.c.	Abdel-kader	S.	10,600	341	0	65	6	..		2	12,000	Turkey	Bldg.	..	14	13¾	3	4 9·4-in. (Krupp), 6 5·9-in., 10 l.	10	17	800	..
c.t.	Assar-i-Schefket	I.	2080	203	5	42	7	16	5	2	1750	La Seyne	1868	..	6	5	..	1 9-in. (Armstrong), 4 7-in., 4 M., 4 l.	..	11·0	300	220
"	Assar-i-Tevfik	I.	4687	272	4	52	6	24	11	1	3560	La Seyne	1868	..	8	6	..	8 9·4-in. (Krupp), 2 8·2-in., 7 M., 4 l.	..	13·0	400	..
"	Avni-Illah	I.	2400	226	4	36	0	16	5	1	2200	Thames	1869	..	6	6	1½	4 9-in. M.L.R. (Armstrong), 4 M., 4 l.	1	12·0	220	225
b.	Azizieh (*a*)	I.	6400	292	0	55	9	25	7	1	3735	Clyde	1864	..	10	6	..	2 2·4-in. (Krupp), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	13·0	750	600
c.b.	Feth-i-Bulend	I.	2806	236	3	39	4	18	1	1	3250	Thames	1869	..	9	9	5	4 9-in. M.L.R. (Armstrong), 4 M., 4 l.	1	13·0	300	250
a.g.b.	Feth-el-Islam	I.	335	101	9	24	7	5	11	1	290	Gironde	1864	..	3	3	..	2 7-in. (Armstrong), 2 l.	..	8·0	20	..
c.b.	Hamidieh	I.	6700	292	0	55	9	24	10	1	4500	Turkey	1885	..	9	5	3	10 10·2-in. (Krupp), 2 6·6-in., 6 l., 2 M.	2	13·0	600	..
a.g.b.	Hisber	I.	404	144	4	30	10	5	7	1	400	Turkey	1875	..	3	3	1	2 4.7-in. (Krupp), 2 M., 2 l.	..	7·0	20	..
t.	Hufzi-el-Rahman	I.	2540	204	0	45	11	14	5	1	200 nom.	Gironde	1868	..	5½	5	..	2 9-in. M.L.R. (Armstrong), 2 7-in., 1 5-in. (Krupp), 6 M.	..	12·0	200	200
c.b.	Idjilalieh	I.	2266	213	3	42	7	17	4	1	1800	Italy	1870	..	6	4½	½	2 9-in. M.L.R. (Armstrong), 2 7-in., 1 5-in. (Krupp), 4 M., 4 l.	..	11·0	300	199
b.	Mahmudieh (*a*)	I.	6400	292	0	55	9	25	7	1	3735	Thames	1864	..	10	6	..	2 9·4-in. (Krupp), 8 8·2-in., 6 3·9 in., 7 M., 2 l.	2	12·0	750	600
a.g.b.	Memdooyeh	I.	335	101	9	24	7	5	11	1	290	Gironde	1864	..	3	3	..	2 7-in. (Armstrong), 2 l.	..	8·0	20	..
c.b.	Mesoodieh	I.	9120	331	5	59	0	25	11	1	7431	Thames	1874	..	12	9	1	12 10-in. M.L.R. (Armstrong), 3 5·9-in. (Krupp), 7 M., 6 l.	..	13·0	600	..
"	Muin-i-Zaffer	I.	2400	230	0	36	0	16	5	2	2200	Tyne	1869	..	6	6	1½	4 10-in. M.L.R. (Armstrong), 1 4·7-in. (Krupp), 4 M., 4 l.	1	12·0	220	..
"	Mukadim-i-Hair	I.	2806	236	3	39	4	18	1	1	3000	Turkey	1872	..	9	9	5	4 10-in. M.L.R. (Armstrong), 1 4·7-in. (Krupp), 4 M., 4 l.	1	12·0	300	250
"	Nedjim-i-Schefket	I.	2080	203	5	42	7	16	5	2	1900	La Seyne	1868	..	6	5	..	1 9-in., 4 7-in. (Armstrong), 4 M., 4 l.	..	11·0	300	220
b.	Orkanieh (*a*)	I.	6400	292	0	55	9	25	7	1	3735	Clyde	1865	..	10	6	..	2 9·4-in. (Krupp), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600
"	Osmanieh (*a*)	I.	6400	292	0	55	9	25	7	1	3735	Clyde	1864	..	10	6	..	2 9·4-in. (Krupp), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600

(*a*) These ships are converted or are being converted. They are cut down forward and aft, and a barbette fitted at each end with one 21-c.m. B.L. (Krupp) in each.

TURKEY.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Cost.	Date of Launch.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.				£		in.	in.			knots.	tons.	
g.v.	Beyruth	W.	609	173 6	26 7	12 10	1	160	England	..	1863 1889	..	..	2 4·7-in. (Krupp), 2 M., 4 l.	..	10·0	120	..
sl.	Brussa	W.	800	172 6	30 6	15 2	1	150	England	..	1859 1887	..	..	2 6-in. (Krupp), 2 4·7-in., 2 M.	1	11·0	120	..
"	Edirneh	W.	782	172 6	30 6	14 2	1	150	England	..	1859 1887	..	..	2 6-in. (Krupp), 2 4·7-in., 2 M.	1	11·0	120	..
cr.	Fezibahri	S.	1815	226 0	35 0	14 0	2	2500	Turkey	..	Bldg.	..	½	6 6-in. (Krupp)	7	17·0	..	..
"	Heibetnuma	S. &W.	1960	226 0	37 0	14 0	1	2500 ind.	Turkey	..	1890	..	..	3 6·6-in. (Krupp), 6 4·7-in., 6 Q.F.	2	14·0	..	..
"	Hundavendikiar	S.	4050	279 0	49 3	21 0	2	..	Turkey	..	Bldg.	..	2	2 8·9-in. (Krupp), 6 5·9-in., 4 3·9-in.	5	..	..	300
g.v.	Iskenderieh	W.	609	173 6	26 7	12 10	1	160	Turkey	..	1863 1885	..	..	2 4·7-in. (Krupp), 2 M., 4 l.	..	11·0	120	..
"	Lutfi-hamayoun	C.	1313	210 0	35 0	14 0	1	2800	Turkey	..	1892	..	..	4 6-in. (Krupp), 6 4·7-in. 6 Q.F.	2	13·0	..	..
sl.	Mansureh	W.	800	174 10	30 6	15 2	1	150	Turkey	..	1863 1888	..	..	2 6-in. (Krupp), 2 4·7-in. 2 M.	1	11·0	120	..
corv.	Mehemet Selim	W.	1300	196 10	32 10	16 6	1	450	Turkey	..	1875	..	..	10 5·9-in. (Krupp), 4 M., 4 l.	1	11·0	250	..
g.v	Mehrieh	W.	609	173 6	26 7	12 10	1	160	Turkey	..	1863	..	..	2 4·7-in. (Krupp) 2 M., 4 l.	..	10·0	120	..
cr.	Mookbir-i-Sooroor (T. Sch.)	W.	1477	209 11	38 0	17 5	1	450	Turkey	..	1879	..	..	22 guns	..	..	..	..
sl.	Muzafer	W.	800	174 10	30 6	15 2	1	150	Turkey	..	1863 1888	..	..	2 6-in. 5-ton (Krupp), 2 4·7-in., 2 M.	1	12·0	150	..

Turkey.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.					£	in.	in.			knots.	tons.	
to. g.b.	Namet	S.	900	230 0	31 0	16 6	2	4500	Gaarden	1890	..	¼	..	2 4-in. (Krupp), 16 M.	2	19·0	..	111
"	Peleng-i-deria	S.	900	230 0	31 0	16 6	2	4500	Gaarden	1890	..	¼	..	2 4-in. (Krupp), 16 M.	2	19·0	..	111
g.v.	Sedul Bahr	W.	800	173 6	26 7	11 6	1	160	Turkey	1894	..	..	2	4 4·7-in. (Krupp), 6 M.	2	12·7	120	..
cr.	Selimieh	S.	4050	279 0	49 3	21 0	2	..	Turkey	Bldg.	..	..	½	2 8·2-in. (Krupp), 6 5·9-in., 4-in., 6 M.	..	..	..	300
"	Shadie	S.	1815	226 0	35 0	14 0	2	2500	Turkey	Bldg.	..	..	..	6 5·9-in. (Krupp) ..	7	17·0	..	..
to. g.b.	Shahani-deria	S.	450	200 0	23 0	9 0	2	3000	Turkey	1892	..	..	..	2 4·7-in. Q.F. (Krupp), 6 M.	4	22·0	..	..
"	New vessel (Y)	S	900	230 0	31 0	16 6	2	4500	Gaarden	Bldg.	..	¼	..	2 4-in. (Krupp), 6 M.	2	19·0	..	..
sl.	Sinope	W.	800	174 10	30 6	15 2	1	150	England	1859 1889	..	..	..	2 6-in. (Krupp), 2 4·7-in., 2 M.	1	10·0	..	..
g.v.	Uthared	W.	609	173 6	26 7	12 10	1	160	Turkey	1863 1885	..	..	..	2 4·7-in. (Krupp), 2 M., 4 l.	..	10·0	120	..
"	Zuhaf	W.	800	173 6	26 7	11 6	1	160	Turkey	1894	..	..	..	4 4·7-in. (Krupp), 6 M.	2	12·7	120	..

Twenty-seven Despatch vessels and yachts, of 194 tons to 1512 tons displacement, and 50 h.p. to 800 h.p. About one-half of these vessels are built of wood.

Five Gunboats, of 200 tons displacement and 60 h.p., and about 10 knots speed. Six gunboats, 120 feet in length, of 200 tons displacement and carrying 4 guns, are now building.

UNITED STATES.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.d.s., t. (1 t.)	Ajax	I.	2100	226 4	43 7	13 9	1	340	Pittsburg	1864	125,000	5	11	..	2 15-in. smooth-bores, 2 l.	..	6·0	160	..
c.d.s., t. (2 t.)	Amphitrite	I.	3990	249 4	55 9	14 3	2	1600	Wilmington	1883	..	9–7½	11½	2	4 10-in., 2 4-in. Q.F., 2 6-pr., 2 3-pr., 2 M.	..	12·0	300	155
a. c.	Brooklyn	S.	9250	400 6	64 0	24 0	2	16,000	Philadelphia	1895	700,000	3–7½	8–5	6–3	8 8-in., 12 5-in. Q.F., 12 6-pr., 4 1-pr., 4 M.	6	21·0	1650	500
c.d.s., t. (1 t.)	Camanche	I.	1875	200 2	45 11	11 6	1	350	New York	1863	125,000	5	10	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
c.d.s., t. (1 t.)	Canonicus	I.	2100	226 4	43 7	13 9	1	320	Boston	1864	125,000	5	10	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
c.d.s., t. (1 t.)	Catskill	I.	1875	200 2	45 11	11 6	1	350	New York	1863	..	5	10	..	2 15-in. 19-ton smooth-bores	..	6·0	150	..
b.	Indiana	S.	10,288	348 0	69 3	25 6	2	9000	Philadelphia	1893	604,000	18 H. S.	6–17	3	4 13-in., 8 8-in., 6 4-in. Q.F., 20 6-pr., 6 1-pr., 4 M.	7	16·0	400	..
b.	Iowa	..	11,300	360 0	72 0	24 6	2	11,000	"	Bldg.	900,000	14	15	3–2½	4 12-in., 8 8-in., 6 4-in. Q.F., 20 6-pr., 6 1-pr., 4 M.	6	16·5	2000	..
c.d.s., t. (1 t.)	Jason	I.	1875	200 2	45 11	11 6	1	350	New York	1864	..	5	11	..	2 15-in. 19-ton smooth-bores	..	6·0	150	..

UNITED STATES.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Belt.	Armour: Gun Position.	Armour: Deck Plating.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
ram	Katahdin* (ex Ammen)	S.	2050	243 0	43 6	15 0	2	4800	Bath, Me.	1893	186,000	6	18	6–3	4 6-pr. Q.F.	..	17·0	..	..
b.	Kearsage	S.	11,500	368 3	72 2	26 6	2	10,500	Newport News.	Bldg.	800,000 each	15 N. S.	6–17 N. S.	3–5 N. S.	4 12-in., 4 8-in., 14 5-in. Q.F., 20 6-pr., 6 1-pr., 4 M.	5	16·0	410	..
b.	Kentucky	S.	11,500	368 3	72 2	26 6	2	10,500	Newport News.	Bldg.	800,000 each	15 N. S.	6–17 N. S.	3–5 N. S.	4 12-in., 4 8-in., 14 5-in. Q.F., 20 6-pr., 6 1-pr., 4 M.	5	16·0	410	..
c.d s., t. (1 t.)	Lehigh	I.	1875	200 2	45 11	11 6	1	350	Chester	1864	..	5	11	..	2 15-in. 19-ton smooth-bores	..	6·0	150	..
c.d.s., t. (1 t.)	Mahopac	I.	2100	226 4	43 7	13 9	1	320	Jersey	1865	..	5	10	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
a. c.	Maine	S.	6682	310 0	57 0	21 6	2	9000	New York	1890	517,600	12	10–12	4–2	4 10-in., 6 6-in., 8 6-pr. Q.F., 8 1-pr., 4 M.	7	19·0	822	400
c. d. s., t. (1 t.)	Manhattan	I.	2100	226 4	43 7	13 9	1	320	Jersey	1865	..	5	..	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
b.	Massachusetts	S.	10,288	348 0	69 3	25 6	2	9000	Philadelphia	1893	604,000	18 P. S.	6–17	3	4 13-in., 8 8-in., 4 6-in., 20 6-pr. Q.F., 6 1-pr., 4 M.	7	16·0	400	..
c.d.s.,t. (2 t.)	Miantonomoh	I.	3990	249 4	55 9	14 3	2	1600	Chester	1876 reblt.	272,000	7	11½	2	4 10-in., 2 4-in. Q.F., 2 6-pr., 2 3-pr., 2 1-pr.	..	10·5	330	155
c.d.s.,t. (2 t.)	Monadnock	I.	3990	249 4	55 9	14 3	2	1600	S. Francisco.	1883 rebit.	272,000	9	11½	2	4 10-in., 2 6-pr. Q.F., 2 3-pr., 2 1-pr. 2 M.	..	12·0	330	155
c.d.s.,t. (1 t.)	Montauk	I.	1875	200 2	45 11	11 6	1	350	Brooklyn	1864	..	5	11	..	2 15-in. 19-ton smooth-bores	..	5·5	160	..
c.d.s.,b.	Monterey	S.	4138	256 0	59 0	14 9	2	5072	S. Francisco.	1891	..	13	10 14	3–2	2 12-in., 2 10-in., 6 6-pr. Q.F., 4 1-pr., 2 M.	..	13·6	200	211
c.d.s.,t. (1 t.)	Nahant	I.	1875	200 2	45 11	11 6	1	350	Boston.	1863	..	5	11	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
c.d.s.,t. (1 t.)	Nantucket	I.	1875	200 2	45 11	11 6	1	350	Boston.	1863	..	5	11	..	2 15-in. 19-ton smooth-bores	..	5·6	160	..
a.c.	New York	S.	8500	380 6	64 10	24 0	2	16,500	Philadelphia	1891	597,000	4	7–10	6–3	6 8-in., 12 4-in. Q.F., 8 6-pr. 4 1-pr. 4 M.	6	21·0	750	484
b.	Oregon	S.	10,288	348 0	69 3	25 6	2	9000	S. Francisco.	1893	636,000	18 H.S.	6–17	3	4 13-in., 8 8-in., 4 6-in., 20 6-pr. Q.F., 6 1-pr., 4 M.	7	16·0	400	..
c.d.s.,t. (1 t.)	Passaic	I.	1875	200 2	45 11	11 6	1	350	Brooklyn	1863	..	5	11	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..
c.d.s.,t. (2 t.)	Puritan	I.	6060	280 0	60 1½	18 1	2	3700	Chester	1884 rebit.	..	12	11½	2	4 12-in., 6 4-in. Q.F., 4 3-pr. 4 1-pr., 4 M.	..	13·0	580	220
c.d.s.,t. (2 t.)	Terror	I.	3990	249 4	55 9	14 3	2	1600	Philadelphia	1883 rebit.	206,800	7	11½	1½	4 10-in., 2 6-pr. Q.F., 2 3-pr., 2 1-pr., 2 M.	..	12·0	330	155
c.	Texas	S.	6300	290 0	64 7	22 6	2	8600	Norfolk	1892	495,000	12	12	3	2 12-in. 46-ton, 6 6-in. 12 6-pr. Q.F., 6 1-pr., 4 M.	6	17·0	850	400
c.d.s.,t. (1 t.)	Wyandotte	I.	2100	225 0	43 7	13 6	1	320	Cincinnati	1864	..	5	10	..	2 15-in. 19-ton smooth-bores	..	6·0	160	..

* This vessel has not yet been accepted, she having failed to make the stipulated speed.

The Senate Committee has decided to make provision in its Naval Appropriation Bill for four new battleships.'

UNITED STATES.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.					£	in.	in.			knots.	tons.	
cr.	Atlanta	S.	3189	270 0	42 0	18 0	1	3511	Chester	1884	123,600	..	1½	2 8-in., 6 6-in., 2 6-pr. Q.F., 2 3-pr., 2 1-pr., 6 M.	..	16·33	490	270
"	Baltimore	S.	4600	315 0	48 6	20 6	2	10750	Philadelphia	1888	210,000	4½	4-2½	4 8-in., 6 6-in., 4 6-pr. Q.F., 2 3-pr., 2 1-pr., 6 M.	5	20·6	400	375
..	Bancroft	S.	838	180 0	32 0	11 6	2	1213	Elizabeth, N.J.	1892	..	..	..	4 4-in. Q.F., 2 6-pr., 2 3-pr., 1 1-pr., 2 M.	2	14·37	200	..
cr.	Bennington	S.	1750	230 0	36 0	14 0	2	3533	Chester	1890	98,000	..	..	6 6-in., 2 6-pr. Q.F., 2 3-pr., 1 1-pr., 4 M.	2	17·5	400	150
"	Boston	S.	3189	270 0	42 0	18 0	1	3780	Chester	1884	123,200	..	1½	2 8-in., 6 6-in., 2 6-pr. Q.F., 2 3-pr., 2 1-pr., 2 1·8-in., 2 1·4-in., 2 M.	..	15·0	490	270
g.v.	Castine (*a*)	S.	1220	198 0	32 0	12 2	2	1600	Bath, Me.	1892	..	..	..	8 4-in. Q.F., 4 6-pr., 2 1-pr., 2 M.	..	16·2	285	165
cr.	Charleston	S.	4040	300 0	46 2	19 6	2	7500	S. Francisco.	1888	..	2	¾	2 8-in., 6 6-in., 4 6-pr. Q.F., 2 3-pr., 2 1-pr., 6 M.	4	18·7	328	300
"	Chicago	S.	4500	315 0	48 2	19 0	2	5218	Chester	1885	177,800	4	1½	4 8-in., 8 6-in., 2 5-in., 10 6-pr. Q.F., 4 1-pr., 2 M.	..	16·3	940	325
"	Cincinnati	S.	3183	291 3	42 0	18 0	2	10,000	Brooklyn	1892	220,000	..	2½	1 6-in., 10 5-in. Q.F., 8 6-pr., 4 1-pr., 2 M	6	19·0	556	295
"	Columbia	S.	7475	412 0	58 2	22 6½	3	21,500	Philadelphia	1892	545,000	..	4-2½	1 8-in., 2 6-in., 8 4-in. Q.F., 12 6-pr., 4 1-pr., 4 M.	6	22·8	2000	..
cr.	Concord	S.	1700	230 0	36 0	14 0	2	3513	Chester	1890	98,000	..	..	6 6-in., 2 6-pr. Q.F., 2 3-pr., 1 1-pr. 4 M.	2	17·3 17·0	400	150
"	Detroit	S.	2000	257 0	37 0	14 6	2	5400	Baltimore	1892	..	..	3	9 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M.	6	18·71	200	187
cr.	Dolphin	S.	1485	239 6	31 10	14 2	1	2300	Chester	1884	61,000	..	..	2 4-in. Q.F., 2 6-pr., 4 M.	..	15·5	310	..
"	Helena	S.	1392	250 0	40 0	10 0	2	1600	Newport News	1896	..	2	2½	8 4-in. Q.F., 6 6-pr., 2 1-pr., 2 M.	..	13·0	100	150
g.v.	Machias (*a*)	S.	1220	198 0	32 0	12 2	2	1600	Bath, Me.	1892	..	..	..	8 4-in. Q.F., 4 6-pr., 2 1-pr., 2 M.	..	15·46	285	165
cr.	Marblehead	S.	2000	257 0	37 0	14 6	2	5400	Boston	1892	122,500	..	3	9 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M.	6	18·94	200	187
cr.	Minneapolis	S.	7475	412 0	58 2	22 6½	3	21,500	Philadelphia	1893	421,000	4	4-2½	1 8-in., 2 6-in. Q.F., 8 4-in., 12 6-pr., 4 1-pr., 4 M.	5	22·8	2000	..
cr.	Montgomery	S.	2000	257 0	37 0	14 6	2	5400	Baltimore	1892	..	..	3	9 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M.	6	18·87	200	187
"	Nashville	S.	1371	200 0	36 0	12 0	2	1790	Newport News	1895	..	2	2½	8 4-in. Q.F., 4 6-pr., 2 1-pr., 2 M.	1	14·0	150	150
"	Newark	S.	4083	310 0	49 0	18 9	2	8869	Philadelphia	1890	250,000	..	..	12 6-in., 4 6-pr. Q.F., 4 3-pr., 2 1-pr., 7 M.	..	19·0	850	300
cr.	Olympia	S.	5800	340 0	53 0	21 6	2	17,363	S. Francisco.	1892	477,600	4	4¾-2	4 8-in., 10 5-in. Q.F., 14 6-pr., 6 1-pr., 4 M.	6	21·69	1300	..
"	Petrel	S.	890	176 3	31 0	11 7	2	1513	Baltimore	1888	50,000	1	1	4 6-in., 2 3-pr. Q.F., 1 1-pr., 4 M.	..	13·7	168	100
cr.	Philadelphia	S.	4413	315 0	48 6	19 3	1	10,500	Philadelphia	1889	265,000	..	4-2½	12 6-in., 4 6-pr. Q.F., 4 3-pr., 2 1-pr., 7 M.	5	19·68	1175	325
cr.	Raleigh	S.	3183	291 3	42 0	18 0	2	10,000	Norfolk	1892	28,600	..	2½	1 6-in., 10 5-in. Q.F., 8 6-pr., 4 1-pr., 2 M.	1	19·0	556	295
"	San Francisco	S.	4083	310 0	49 2	18 9	2	10,400	S. Francisco.	1889	270,000	4½	3-2	12 6-in., 4 6-pr. Q.F., 4 3-pr., 2 1-pr., 7 M	6	20·2	850	300
"	Vesuvius (Dynamite Gun Cruiser)	S.	930	246 0	26 6	10 7¼	2	4450	Philadelphia	1888	70,000	..	..	3 dynamite guns, 15 in. cal., 3 3-pr. Q.F.	..	21·6	150	..
"	York Town	S.	1703	230 0	36 0	14 0	2	3660	Philadelphia	1888	98,000	..	..	6 6-in., 2 6-pr. Q.F., 2 3-pr., 1 1-pr., 4 M.	2	17·2	400	150
"	Wilmington	S. sh.	1392	250 0	40 0	10 0	2	1600	Newport News	1895	..	2	..	8 4-in. Q.F., 6 6-pr., 2 1-pr., 2 M.	..	13·0	100	150
"	No. 15	S. sh.	1200	174 0	34 0	13 5	2	850	S. Francisco.	B	..							..
"	No. 14	S. sh.	1200	174 0	34 0	13 5	2	850	S. Francisco.	Bldg	..							..
"	No. 13	S. sh.	1000	168 0	36 0	12 7	1	850	Camden	Bldg.	..		..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 3-pr. H.I.M.	..	12.0	100	122
"	No. 12	S. sh.	1000	168 0	36 0	12 7	1	850	Bath, Me.	Bldg.	..							
"	No. 11	S. sh.	1000	168 0	36 0	12 7	1	850	Bath, Me.	Bldg.	..							
"	No. 10	S. sh.	1000	168 0	36 0	12 7	1	850	New Jersey	Bldg.	..							

(*a*) Has been lengthened 14 feet amidships to increase her stability.

Three paddle steamers.—Michigan (685 tons and 300 horse-power), and the Monocacy (1370 tons and 850 horse-power), and the Thetis of 1250 tons building.
Ten screw steamers, of from 300 tons to 560 tons, and about 300 to 500 H.P.

SHIPS BELONGING TO POWERS WHOSE NAVIES ARE OF LITTLE OR NO IMPORTANCE.

Belgium.—Twelve steam vessels, between 419 and 684 tons net, launched between 1870 and 1888, principally employed as packets, which are under the orders of the Government.

Bulgaria.—Eleven steamers of small size, of which one is used as the Prince's Yacht. Two armoured gunboats, for the defence of the Danube, building at Leghorn.

Egypt.—This power has now no efficient war ships.

Hayti.—Steel gun vessel—Crête à Pierrot—1000 tons, 1 6·2-in., 1 4·7-in., and 4 3·9-in. Q.F., 6 M. Steel gunboat—Capois la Mort—260 tons, 1 3·9-in., and 4 1-pr. Q.F. Iron corvette—Dessalines—1200 tons, armed with 1 3·9-in. Q.F., 2 3·9-in. B.L., 2 l., 2 M. Three iron or steel sloops:—St. Michael, 1804, and Toussaint L'Ouverture, of from 500 to 900 tons, all of 12 to 14 knots speed, and armed with one large and four to eight small guns. Gun vessel, 22nd of December, of 900 tons, 9 knots speed, armed with four 40-pdr. Armstrongs.

Liberia.—The Gorronommah gunboat of 150 tons displacement; completed 1892, and another one, the Rocktown, completed at Rotterdam in 1894.

Mexico.—The Zaragoza, built of steel, 1200 tons, 1300 horse power, 15 knots speed, and armed with four 4·7-in. guns and 4 rapid firing guns. Two gun vessels of 450 tons, and 11 knots speed, armed with two 6½-inch muzzle loaders and two small guns. Two small gunboats of 10 knots speed.

Morocco.—A torpedo cruiser, of 1200 tons displacement, 2500 HP., 18 knots speed, and carrying two guns, 4·7-in. B.L., and 4 Q.F. guns, built in 1892.

Persia.—Despatch vessel—the Persepolis—of 1200 tons and 10 knots speed. She is armed with 5 small breech-loading guns.

Peru.—Lima, built in 1881, of 1700 tons displacement, 1800 horse-power, and 16-knots speed; armed with two 6-in. B.L.R. guns. Screw steamer Santa Rosa of about 400 tons.

Roumania.—Elizabeta, protected cruiser (deck 3 in. thick), built in 1887 at Elswick; 230 ft. long, 32 ft. 10 in. beam, 1320 tons, 4500 I.H.P.; 4 5·9-in. B.L.R., 4 Q.F., 2 M., 4 torpedo tubes. Composite gunboat Mircea, 350 tons; Grivitza, 180 tons. Six gunboats of 45 to 110 tons, seven to 9 knots speed. Six coast-guard vessels—Oltul, Siretul, Bistritza, Olteano, Smeo, and Monteano—95 tons, 100 ft. long, 13·6-in. beam, 6 ft. draught; natural draught 11 knots, forced draught 13½ knots; 1 Q.F., 2 M. Screw steamer—Romania—240 tons, repaired 1890. Three first-class torpedo-boats (120 ft. 6-in., 21 knots); 2 second-class (63 ft. 16·5 knots), built 1882–1888.

Saint Domingo.—The Independencia, built in England 1894, 170 ft. long, 25 ft. broad, displacement 322 tons, and armed with seven Hotchkiss quick-firing guns. Restauracion, steel gun-vessel, 1000 tons, building at Glasgow.

Sarawak.—Two gunboats, of 175 and 118 tons respectively, of low speed, each armed with two guns.

Siam.—Two corvettes (800 tons, 8 guns); two gun-vessels. One protected deck cruiser, the Maha Chakrkri, 290 ft. long, 39 ft. 4 in. broad, of 2500 tons displacement and 17 to 18 knots speed; armament, four 4·7-in. quick-firing guns, and ten 6-pdr. quick-firing guns.

Uruguay.—Gunboats: General Artiga, 274 tons, 12½ knots speed, 2 4·7-in. (Krupp), 2 M.; General Rivera, 300 tons, 12 knots speed, armed with 1 5·9-in. and 1 2·3-in. gun; and the Genera Jaurez.

BRITISH AND FOREIGN TORPEDO-BOAT FLOTILLAS.

The Tables below are substantially those which appeared in last year's *Naval Annual*. By the kind assistance of many torpedo-boat builders, British and foreign, they have been brought up to date.

The following is the usual synopsis of the torpedo-boats, other than submarine-boats, described in the tables:—

Power.	Destroyers.	Sea-going. 126 ft. to 150 ft.	1st Class. 115 ft. to 125 ft.	2nd Class. 101 ft. to 114 ft.	3rd Class. 86 ft. to 100 ft.	Vedettes. 85 ft. and under.
Great Britain ..	70	43	26	4	20	73
British Possessions	..	8	..	1	..	11
Argentine Republic	4	8	..	..	4	14
Austria-Hungary ..	..	30	..	5	26	9
Brazil	8	8	..	..	6	8
Chili	4	..	1	..	8	4
China	..	6	1	25	2	13
Costa Rica	..	..	..	..	..	1
Denmark	4	6	1	3	2	16
France	3	44	63	84	36	14
Germany	11	64	61	4	..	16
Greece	..	6	..	..	11	33
Italy	6	105	..	4	37	30
Japan	1	..	20	17	16	..
Mexico	..	5	..	..	..	..
Netherlands	13	6	9	3	6	23
Norway	..	..	..	7	3	4
Portugal	..	..	15	5	1	24
Roumania	..	3	..	..	..	2
Russia	1	55	6	1	..	109
Spain	2	12	24	2	..	6
Sweden	..	..	12	8	12	7
Turkey	4	9	17	..	7	..
United States ..	..	2	..	..	1	4

Great Britain and Dependencies.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Great Britain.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
TORPEDO-BOAT DESTROYERS													
Ardent	Chiswick	1894	200	19	7	2	250	4,500	27·97	1-12 pr. 5-6 prs.	2	45	60
Banshee	Birkenhead	1894	210	19·5	..	2	265	4,400	27·57	1-12 pr. 5-6 prs.	2	50	
Boxer	Chiswick	1894	200	19	7·8	2	250	4,800	29·17	1-12 pr. 5-6 prs.	2	45	60
Bruiser	Chiswick	1895	200	19	7·8	2	250	4,500	29·97	1-12 pr. 5-6 prs.	2	45	60
Charger	Poplar	1894	190	18·5	5·25	2	220	3,500	26·08	1-12 pr. 5-6 prs.	2	45	60
Conflict	East Cowes	1894	205·6	20	..	2	230	4,370	[27]	1-12 pr. 5-6 prs.	2	50	
Contest	Birkenhead	1894	210	19·5	..	2	265	4,400	27·4	1-12 pr. 5-6 prs.	2	50	
Daring	Chiswick	1893	185	19	6·3	2	220	4,842	27·70	2-12 prs. 3-6 prs.	3		50
Dasher	Poplar	1895	190	18·5	5·25	2	220	3,182	26·21	1-12 pr. 5-6 prs.	2	45	60
Decoy	Chiswick	1894	185	19	7	2	220	3,900	27·77	1-12 pr. 3-6 prs.	3		50
Dragon	Birkenhead	1894	210	19·5	..	2	265	4,500	27·14	1-12 pr. 5-6 prs.	2	50	
Ferret	Birkenhead	1893	194	19·25	5	2	220	4,810	27·62	1-12 pr. 3-6 prs.	3	50	70
Fervent	Paisley	1895	200	19	7·8	2	250	3,800	[27]	1-12 pr. 5-6 prs.	2	50	70
Handy	Govan	1895	200	19	7·8	2	250	3,800	27·04	1-12 pr. 5-6 prs.	2	50	70
Hardy	Sunderland	1895	196	19	5	2	245	4,200	[27]	1-12 pr. 5-6 prs.	2	50	70
Hart	Govan	1895	185	19	7	2	285	4 010	27.07	1-12 pr. 5-6 prs.	2	50	70
Hasty	Poplar	1894	190	18·5	5·25	2	220	3,250	26·08	1-12 pr. 5-6 prs.	2	45	60
Haughty	Sunderland	1895	196	19	5	2	245	4,000	[26]	1-12 pr. 5-6 prs.	2	50	60
Havock	Poplar	1893	180	18·5	5·25	2	220	3,500	26·17	1-12 pr. 3-6 prs.	3	43	57
Hornet	Poplar	1893	180	18·5	5·25	2	220	4,000	27·31	1-12 pr. 3-6 prs.	3	43	57
Hunter	Govan	bldg.	..	..	..	2	..	4,000	[27]	1-12 pr. 5-6 prs.	2		
Janus	Jarrow	1895	200	19·7	6·5	2	277	3,950	[27]	1-12 pr. 5-6 prs.	2	50	60
Lightning	Jarrow	1895	200	19·7	6·5	2	277	4,000	27·94	1-12 pr. 5-6 prs.	2	50	60
Lynx	Birkenhead	1894	194	19·25	5	2	220	4,000	27·00	1-12 pr. 3-6 prs.	3	50	70
Opossum	Hebburn	1895	200	19	5·2	2	264	4,052	28·24	1-12 pr. 5-6 prs.	2	50	60
Porcupine	Jarrow	1895	200	19·7	6·5	2	277	3,650	27·91	1-12 pr. 5-6 prs.	2	50	60
Ranger	Hebburn	1895	200	19	5·2	2	264	3,900	27·13	1-12 pr. 5-6 prs.	2	50	60
Rocket	Clydebank	1894	205·6	19·5	5·25	2	250	4,200	27·37	1-12 pr. 5-6 prs.	2	50	60
Salmon	Hull	1895	200	19·5	5·4	2	264	3,580	27·61	1-12 pr. 5-6 prs.	2	50	60
Shark	Clydebank	1894	205·6	19·5	5·25	2	250	4,250	27·59	1-12 pr. 5-6 prs.	2	50	60
Skate	Barrow	1895	195	20·5	..	2	240	4,100	27·10	1-12 pr. 5-6 prs.	2	50	60
Snapper	Hull	1895	200	19·5	5·5	2	264	4,500	27·9	1-12 pr. 5-6 prs.	2	50	60
Spitfire	Elswick	1895	200	19	5·3	2	261	3,780	[27]	1-12 pr. 5-6 prs.	2	45	60
Starfish	Barrow	1894	195	20·5	..	2	240	4,000	27·97	1-12 pr. 5-6 prs.	2	45	60
Sturgeon	Barrow	1894	195	20·5	..	2	240	4,010	27·16	1-12 pr. 5-6 prs.	2	45	60
Sunfish	Hebburn	1895	200	19	5·2	2	264	4,292	27·62	1-12 pr. 5-6 prs.	2	50	60
Surly	Clydebank	1894	205·6	19·5	5·25	2	250	4,400	28·05	1-12 pr. 5-6 prs.	2	50	50
Swordfish	Elswick	1895	200	19	5·3	2	264	4,100	[27]	1-12 pr. 5-6 prs.	2	45	60
Teazer	East Cowes	1895	200	19·5	5·6	2	250	4,500	[27]	1-12 pr. 5-6 prs.	2	50	60
Wizard	East Cowes	1895	200	19·5	5·2	2	250	4,400	[27]	1-12 pr. 5-6 prs.	2	45	60
Zebra	Blackwall	1895	200	20	6	2	280	3,850	[27]	1-12 pr. 5-6 prs.	2	50	60
Zephyr	Paisley	1895	200	19	5·3	2	300	3,850	[27]	1-12 pr. 5-6 prs.	2	50	60
Angler	Chiswick	bldg.	210	20	5·3	..	..	..	..	..	..	..	..
Ariel	Chiswick	bldg.	210	20	5·3	..	..	..	..	..	..	..	..
Avon	Barrow	bldg.	210	20	5·3	..	..	..	..	..	..	..	..
Bat	Jarrow	bldg.	210	20	5·3	..	..	..	..	..	..	..	..
Bittern	Barrow	bldg.	210	20	5·3	..	..	..	..	..	..	..	..
Brazen	Clydebank	bldg.	210	20	5·3	2	300	..	[30]	1-12 pr. 5-6 prs.	2	58	80
Chamois	Jarrow	bldg.	210	20	5·3	..	..	..	..	..	..	..	..
Crane	Jarrow	bldg.	210	20	5·3	..	..	..	..	..	..	..	..
Desperate	Chiswick	1895	210	20	5·3	2	300	..	[30]	1-12 pr. 5-6 prs.	2	58	80
Earnest	Birkenhead	bldg.	210	21·7	5·3	2	300	6,000	[30]	1-12 pr. 5-6 prs.	2	58	80
Electra	Clydebank	bldg.	210	20	5·3	2	300	..	[30]	1-12 pr. 5-6 prs.	2	58	80
Fame	Chiswick	bldg.	..	..	..	..	..	..	..	..	..	..	..
Flyfish	Jarrow	bldg.	210	20	5·3	..	..	..	..	..	..	..	..
Foam	Chiswick	bldg.	..	..	..	..	..	..	..	..	..	..	..
Griffon	Birkenhead	bldg.	210	20	5·3	2	300	6,000	[30]	1-12 pr. 5-6 prs.	2	58	80
Locust	Birkenhead	bldg.	210	21·7	5·3	2	300	6,000	[30]	1-12 pr. 5-6 prs.	2	58	80
Mallard	Chiswick	bldg.	..	..	..	..	..	..	..	..	..	..	..
Panther	Birkenhead	bldg.	210	21·7	5·3	2	300	6,000	[30]	1-12 pr. 5-6 prs.	2	58	80
Quail	Birkenhead	1895	210	21·7	5·3	2	300	6,000	[30]	1-12 pr. 5-6 prs.	2	58	80
Recruit	Clydebank	bldg.	210	20	5·3	2	300	..	[30]	1-12 pr. 5-6 prs.	2	58	80
Seal	Birkenhead	bldg.	210	21·7	5·3	2	300	6,000	[30]	1-12 pr. 5-6 prs.	2	58	80
Sparrowhawk	Birkenhead	1895	210	21·7	5·3	2	300	6,000	[30]	1-12 pr. 5-6 prs.	2	58	80
Star	Jarrow	bldg.	210	20	5·3	..	..	..	..	..	..	..	..
Thrasher	Birkenhead	1895	210	21·7	5·3	2	300	6,000	[30]	1-12 pr. 5-6 prs.	2	58	80
Virago	Birkenhead	1895	210	21·7	5·3	2	300	6,000	[30]	1-12 pr. 5-6 prs.	2	58	80
Vulture	Clydebank	bldg.	210	20	5·3	2	300	..	[30]	1-12 pr. 5-6 prs.	2	58	80
Whiting	Jarrow	bldg.	210	20	5·3	..	..	..	..	..	..	..	..
Wolf	Birkenhead	bldg.	210	21·7	5·3	2	300	6,000	[30]	1-12 pr. 5-6 prs.	2	58	80

Great Britain and Dependencies—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
1 (*ex* Lightning)	Chiswick ..	1877	84·6	10·9	5	1	27	460	19	..	1	..	
2–9 (8 boats)	Chiswick ..	1878–9	87	10·9	4	1	28	450	20	..	1	15	
10	Chiswick ..	1880	90·5	10·9	4	1	28	450	21·7	..	1	25	
11, 12 (2 boats)	Chiswick ..	1880	87	10·9	4	1	28	450	20	..	1	15	7
13	Lambeth ..	1878	87	10·9	4	1	28	460	21	..	2	15	7
14	Poplar	1878	87	11	4·5	1	33	550	22	..	2	15	7
15	..	..	87	10·9	4	1	28	450	21	..	2	15	7
17, 18 (2 boats)	Poplar	1877	86	11	4·5	1	33	450	21	..	2	15	7
19	East Cowes ..	1878	87	10·9	4	1	28	460	21	..	2	15	7
20	..	1880	87	10	4	..	28	360	16·9	..	2	15	
21, 22 (2 boats)	Chiswick ..	1885	113	12·5	5·7	1	63	730	20	..	3	..	10
23, 24 (2 boats)	Poplar	1885–6	113	12·5	5·5	1	67	600	19·5	2–3 prs.	3		
25–29 (5 boats)	Chiswick ..	1886	127·5	12·5	6·2	1	60	600	21	..	4	15	
30–33 (4 boats)	Poplar	1886	125	13	5·5	1	60–66	670	19·5	2–3 prs.	5	15	20
34–38 (5 boats)	East Cowes ..	1886	125	14·6	4	1	60–66	950	18–19	..	5	15	
39, 40 (2 boats)	Poplar	1885	100	12·5	..	..	40	500	..	..	1	15	
41–60 (20 boats)	Chiswick ..	1886	127·5	12·5	6·2	1	60	700	21	2–3 prs.	4	15	
61, 63–74, 76–78 (16 boats)	Poplar	1886	125	13	5·5	1	75	700	19–20	2–3 prs.	5	15	20
79	Poplar	1886	125	13	5·5	..	75	1,000	22·4	2–3 prs.	..	15	20
80	Poplar	1887	135	14	6	1	105	1,540	23	4–3 prs.	5	21	30
81 (*ex* Swift)	East Cowes ..	1885	150	17·5	..	1	125	..	..	6–3 prs.	3	25	35
82–87 (6 boats)	Poplar	1889	130	13·5	5·5	1	85	1,100	23	3–3 prs.	3	19	20
88, 89 (2 boats)	Poplar	1894	142	14·75	4	1	112	1,600	..	3–3 prs.	3	18	20
90	Poplar	1895	140	14·25	3·75	1	100	1,430	..	3–3 prs.	3	18	18
91, 92 (2 boats)	Chiswick ..	1894	140	15·5	7·5	1	130	2,400	23–24	3–3 prs.	3	18	25
93	Chiswick ..	1893	140	15·5	5·4	2	130	2,200	23·5	3–3 prs.	3	18	25
94–96 (3 boats)	East Cowes ..	1894	140	15·5	..	1	130	2,000	23·2	3–3 prs.	3	18	25
97	Birkenhead ..	1893	140	15·5	..	1	130	2,690	23.35	3–3 prs.	3	18	25
SECOND CLASS—													
38–48 (10 boats)	Poplar	1889	60	9·2	3·7	1	16·5	230	16·5	1 mach.	1	9	11
49, 50 (2 boats)	Poplar	1887	60	8·5	3	1	15	200	17	1 mach.	1	9	
51–62 (12 boats)	Chiswick ..	1878–9	60·5	7·5	3·5	1	..	..	16·5	..	2	7	
63	..	1879	60	..	..	1	..	..	15	..	2		
64–73 (10 boats)	Chiswick ..	1880–1	60·5	7·5	3·5	1	..	..	16–17	..	2	7	
74, 75, 96, 97 (4 boats)..	Poplar	1883	62	7·6	3·6	1	12	..	16	1 mach.	2	7	
76–95 (20 boats)	Chiswick ..	1882–3	63	7·5	3·5	1	..	..	16·5–17	..	2	7	
98	Chiswick ..	1883	66·3	7·5	2·5	hyd.	..	120	12·6	..	2	7	
99, 100 (2 boats)	Chiswick ..	1886	64	8	3·6	1	..	..	16–16·8	..	2	7	
101	..	..	64	..	..	..	..	..	..	..	2	7	
1–9 (9 boats)	East Cowes ..	..	56	..	..	1	12	..	14·5	2 mach.	sp	..	·7
Victoria.													
Childers	Chiswick ..	1883	113	12·5	5·9	1	65	730	20	2–1 prs.	..	12	10
One boat	Poplar	1891	130	13·5	5·7	1	82	1,150	23	3–3 prs.	3	19	20
Nepean, Lonsdale (2 boats)	Chiswick ..	1884	63	7·5	3·2	1	12	150	17·5	..	1	7	
New South Wales.													
Acheron, Avernus (2 boats)	..	1879	..	..	..	1	16	300	16				
Queensland.													
Mosquito	Chiswick ..	1884	63	7·5	3·2	1	12	..	17	..	1	7	
Wasp	..	..	..	..	..	..	12	..	..	..	..	7	
Tasmania.													
One boat	Chiswick ..	1884	63	7·5	3·2	1	12	..	17	..	1	7	
New Zealand.													
Nos. 1–4 (4 boats)	Chiswick ..	1881	63	7·5	3	1	12	170	17	1 mach.	Sp.		
India.													
Nos. 1–3 (3 boats)	Chiswick ..	1888	131·5	14·8	7·1	1	96	1,270	23·2	2 Q.F.	5		
Nos. 4–6 (3 boats)	East Cowes ..	1889	130	14·6	..	..	95	1,030	20				
No. 7	Paisley	1888	130·4	14	..	..	92	1,060	21				

Argentine Republic.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
2 boats	Chiswick ..	1890–1	150	14·5	5·2	2	110	1,500	24·52	3 3-prs.	3	27	22
6 boats	Poplar.. ..	1890	130	13·5	6	1	85	1,200	23–24	2 3-pr. Q.F.	2	15	15
4 boats	Poplar.. ..	1880–2	100	12·5	6	1	52	600	20	2 mach.	3	14	10
Second Class—													
Nos. 1–8 (8 boats)..	Poplar.. ..	1890	60	9.2	3	1	16	230	17	1 Q.F.	1	10	1.25
Nos. 9–10 (2 boats)	Chiswick ..	1881	60·5	7·5	3·5	1	..	..	17	..	sp.		
Vedette Boats—													
Nos. 1–4 (4 boats) ..	..	1875	55	7	..	..	..	..	..	.	sp.		

The two 150-ft. boats are named Comodoro Py and Murature.

The six 130-ft. boats are named Bathurst, Buchardo, Jorge, King, Pinedo, and Thorne. They have locomotive boilers.

The four 100-ft. boats are named Alerta, Centella, Ferre, and Py.

Messrs. Yarrow are building four torpedo destroyers.

Austria-Hungary.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
2 boats	Poplar.. ..	1885	135	13·7	5·6	1	95	1,250	22·4	2 Nord.	2	16	28
22 boats	Elbing, Trieste, &c.	1886-9	128	15·9	6·9	1	83	900 / 1,000	17·5 to 21·5	2 mach.	2	15	28
5 boats	Yarrow ..	Bldg.	147	14·6	..	..	120	..	25	..			
1 boat (Viper).. ..		1895							24		2		
Second Class—													
Nos. 9–34 (26 boats)	Pola, Elbing, Chiswick, and Poplar.	..	67	8·5	3·5	1	..	..	18	1 mach.	2		
		..	86	11	4	1	33	450	19·5				
		..	87	10·8	5	1	..	..	18				
		1881	100	12	4·5	1	50	500	21				
Nos. 35–39 (5 boats)	Pola	..	..	..	..	1	63	..	20·5				
Nos. 1–8 (8 boats) ..	Pola and Poplar ..	..	..	..	..	1	27	250	15–18				
1 boat	E. Cowes ..	..	..	..	..	..	11	..	11				

Six sea-going boats proposed to be laid down in 1896.

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Nos. 1–5 (5 boats)	Poplar.. ..	1882	100	12·5	5·5	1	52	600	20	2 mach.	2	16	20
Araguary..	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·1	2 Q.F.	4	27	22
Iguatemi	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·4	2 Q.F.	4	27	22
Marcilio Diaz	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·8	2 Q.F.	4	27	22
3 boats	Elbing ..	1892–3	152	17·2	7·9	2	130	2,200	26	2–1 prs.	3	24	30
Piratiny	..	..	130	12	..	..	..	..	10	2–1 pr.	1		
Poty	..	..	126	12	3	..	30	..	18	1–1 pr.	1		
Second Class—													
Inhanhuay (wood)..	New York..	1893	90	10	3	..	17	..	25	1–1 pr.	1	10	
4 boats	..	1883–4	..	..	..	1	17	..	17	..	..		
1 boat	Chiswick ..	1885	63	75	3·2	1	..	..	17			..	2
1 boat	Poplar.. ..	1886	60	8	3	1	14	200	17	..	1		
Third Class—													
Moxoto	Poplar.. ..	..	60	9·3	..	..	..	..	16	1–1 pr.	1		
5 boats	Chiswick ..	1883	45	6	1·2	1	3·5	..	12-13	1 mach.	sp.		

Eight destroyers of 26 knots, six torpedo-boats, and two submarine boats have been ordered.

Chili.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
Destroyers—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Capitan Orella ..	Birkenhead.	1896	210	21·6	..	2	..	6000	30	..	..	..	..
Capitan Munoz Gamero..	Birkenhead.	Bldg.	210	21·6	..	2	..	6000	30	..	..	..	..
Teniente Serrano ..	Birkenhead.	Bldg.	210	21·6	..	2	..	6000	30	..	..	..	..
Guardia-Marina Riquelme	Birkenhead.	Bldg.	210	21·6	..	2	..	6000	30	..	..	..	..
First Class—													
3 boats	Poplar.. ..	1881	86	12·5	..	1	25	400	19-20	..	4	15	
5 boats	Poplar.. ..	18-1	100	12·5	..	1	35	400	18–19	4 mach.	4	15	9
Sergente Aldea ..	Poplar.. ..	1886	125	13·5	5·5	1	70	800	20	2 Q.F.	4	18	15
Second Class—													
Colocolo	Poplar ..	1880	45	8	..	..	5	40	16	2 mach.	2		
Tucapel	..	1880	50	9	..	..	5	40	16	2 mach.	2		
1 boat	East Cowes	1887	50	..	..	..	..	..	16				
1 boat	East Cowes	1892	60	9·6	5	1	15	270	19	..	1		

China.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
1 boat	Elbing ..	1886	144·3	16·4	7·5	1	128	1,600	24·2	4 1-p . revs.	2	20	15
1 boat	Poplar.. ..	1887	128	13	5	1	69	1,000	23·9	{ 3 Q.F., 4 Gatlings }	3	28	15
25 boats	Stettin, &c. .	1886–87	110	13	4·9	1	65	1,000	19·5	2 1-pr. revs.	3	16	10
2 boats	Stettin ..	1883	86	10·4	3·4	1	28	650	18·2	2 1-pr. revs.	2	16	12
1 boat	Stettin ..	1884	123·5	21·7	..	..	..	..	19	..	5	16	
4 boats	Germany ..	Bldg.	..		..	..	120	1,250	..	2 Q.F.	2		
SECOND CLASS—													
11 boats	Elbing ..	1885–86	85	11·9	4·8	1	27	400	19	..	1	..	5
2 boats	China	..	52	6·7	3·3	1	..	..	16				

Particulars uncertain.

Costa Rica.

Costa Rica has one 62-ft., 15 knot boat.

Denmark.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Delfinen	Chiswick ..	1883	111·5	12·6	6	1	59	620	20	1 mach.	2	14	9
Haien	Chiswick ..	1879	94	10·5	5	1	32	350	21·3	1 mach.	1	12	4
Havhesten	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·8	2 1-pr. revs.	4	20	15
Hvalrossen	Chiswick ..	1884	114	12·6	6·5	1	64	660	18·7	1 mach.	2	14	10
Makrelen	Copenhagen	1893	140	14·2	7	2	112	1,200	..	..	..	..	16
Narhvalen	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·3	2 1-pr. revs.	4	20	15
Nord Kaperen.. ..	Copenhagen	1893	140	14·2	7	2	112	1,200	..	2 1-pr. revs.	4	..	16
Sölöven	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23·3	2 mach.	4	20	14
Söulven	Havre.. ..	1880	94·8	10·9	3·9	1	37	450	18·1	..	2	12	5
Springeren	Copenhagen	1891	119	13	4·9	1	81	800	18·3	2 1-pr. revs.	2	20	14
Stören	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23	2 mach.	4	20	14
Sværdfisken	Chiswick ..	1881	110	12	6	1	49	600	20·7	1 mach.	2	14	9
1 boat	Copenhagen	Bldg.	85	13	..	..	44	360	14	2 mach.	1	..	..
SECOND CLASS—													
Nos. 4, 5 (2 boats) ..	Chiswick ..	1882	63	7·5	2·5	1	15	150	16·9	1 mach.	2	6	1
Nos. 6, 7 (2 boats) ..	Chiswick ..	1884	66·8	8	4·2	1	16	170	15·4	1 mach.	2	6	1·5
Nos. 8, 9 (2 boats) ..	Chiswick ..	1886	69·5	8·1	3·8	1	17	170	15·7	1 mach.	2	6	1
Nos. 10, 11 (2 boats).	Chiswick ..	1888	70·2	8	4	1	18	180	15·8	1 mach.	2	6	1
Nos. 12, 13 (2 boats).	Chiswick ..	1889	78·3	9	4·9	1	24	350	18	1 mach.	2	8	3
1 boat	Chiswick ..	1875	58	7·5	3	1	..	..	16	..	sp.		

Four destroyers and two boats are provided for.

France.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
SEA-GOING—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Agile	La Seyne ..	1889	139	14·7	7·7	2	103	1,100	20·4	3–3 prs.	2	26	14
Alarme	St. Nazaire	1889	151	15·7	8·3	2	148	1,400	20·5	2–3 prs.	4	30	40
Aquilon	Normand ..	1895	137·8	14·6	7·9	2	120	2,000	25	2–3 prs.	2	34	17
Archer	Normand ..	1893	138	14·7	6·5	2	120	1,250	21	2–3 prs.	2	26	17
Argonaute..	St. Denis ..	1893	141	16·4	9·3	2	120	1,500	25·1	2–3 prs.	2	34	16
Ariel	Normand ..	1895	141	16·4	9·3	2	117	1,500	23·5	2–3 prs.	2	34	16
Audacieux..	La Seyne ..	1889	139	14·7	7·7	2	103	1,100	20·3	3–3 prs.	2	26	14
Aventurier	St. Nazaire..	1889	151	15·7	8·3	2	148	1,400	20·5	2–3 prs.	4	34	40
Averne	Havre ..	1894	141	16·4	9·3	2	117	1,500	24·4	2–3 prs.	2	27	16
Chevalier	Normand ..	1893	144·3	15·7	6·8	2	110	2,700	27·2	2–1 prs.	2	32	17
Corsaire	St. Denis ..	1893	160·5	15	5·4	2	150	2,500	25·5	4–1 prs.	2	32	15
Coureur	Chiswick ..	1888	147·5	14·5	4·6	2	120	1,550	23·28	4 Nords.	2	27	22
Cyclone (ex-Tenare) ..	..	Bldg.	..	..	..	..	..	..	30	2–1 prs.	..	..	..
Dauphin	Havre ..	1894	141	16·4	9·3	2	115	1,500	25·22	2–3 prs.	2	34	16
Défi	St. Nazaire..	1889	151	15·7	8·3	2	148	1,400	21	2–3 prs.	4	30	40
Dragon	Normand ..	1892	138	14·7	8·2	2	118	1,400	25	2–3 prs.	2	26	15·5
Eclair	La Seyne ..	1891	144·3	14·7	7·7	2	106	1,100	21·5	3–3 prs.	2	26	17
Flibustier	Normand ..	1894	143	16·4	9·3	2	117	1,500	23·5	2–3 prs.	2	34	16
Forban	Normand ..	1895	144·2	15·2	10	2	130	3,200	31·2	2–1 prs.	2	..	..
Grenadier	Normand ..	1892	138	14·7	8·2	2	118	1,400	25·25	2–3 prs.	2	26	15·5
Grondeur	Havre	1892	147·5	14·5	5	2	114	1,550	24	2–3 prs.	2	27	20
Kabyle	La Seyne ..	1891	144·3	14·7	7·7	2	106	1,100	21·6	3–3 prs.	2	27	17
Lancier	Normand ..	1893	138	14·7	8·2	2	118	1,400	25·79	2–3 prs.	2	26	15·5
Mangini	Nantes ..	Bldg.	147·6	14·8	7·9	2	129	2,100	25	2–3 prs.	2	34	17
Mousquetaire	Havre ..	1892	154	15·7	7	2	125	2,100	24·77	2–1 prs.	2	32	18
Orage	La Seyne ..	1891	144·3	14·7	7·7	2	106	1,100	21·7	3–3 prs.	2	26	17
Ouragan	Nantes ..	1887	151	15·7	8·3	2	148	1,400	20	2–3 prs.	4	30	40
Sarrazin	Bourdeaux..	1893	139	14·7	7·7	2	103	1,100	20·5	3–3 prs.	2	26	14
Téméraire	St. Nazaire..	1889	151	15·7	8·3	2	148	1,400	21	2–3 prs.	4	30	40
Tourbillon	Bourdeaux..	1892	139	14·7	7·7	2	103	1,100	20·5	3–3 prs.	2	26	14
Tourmente	St. Denis ..	1893	141	16·4	9·3	..	120	1,500	24·6	2–3 prs.	2	25	15
Turco	St. Denis ..	1892	138	14·7	8·2	2	118	1,400	21·3	2–3 prs.	2	26	15·5
Véloce..	Havre	1892	147·5	14·5	5	2	114	1,550	23·6	2–3 prs.	2	27	20
Zouave	St. Denis ..	1892	138	14·7	8·2	2	118	1,400	21·3	2–3 prs.	2	26	15·5
FIRST CLASS—													
Balny	Normand ..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	12
Bouët-Willaumez	St. Denis ..	1888	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	12
Capt. Cuny	..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	12
Capt. Mehl	..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	12
Challier	..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	12
Dehorter	St. Denis ..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	12
Deroulède	Normand ..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	12
Doudart de Lagrée	Normand ..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	12
Edmond Fontaine	St. Denis ..	1888	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	12
151 (*ex* G. Charmes) ..	La Seyne ..	1886	132·5	12·5	6·6	1	74	560	18·8	2–1 prs.	..	23	12
126–129 (4 boats)	Normand ..	1888–9	118	13·2	8·7	2	78	1,250	21	2–1 prs.	2	21	10
145–149 (5 boats)	Normand ..	1891–3	118	13·2	8·7	2	75	1,300	23·9	2–1 prs.	2	21	10
152–154 (3 boats)	Normand ..	1892–	118	13·2	8·7	2	75	1,300	24·6	2–1 prs.	2	21	10
155–157 (3 boats)	Bourdeaux..	1893	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
158–160 (3 boats)	Cail	1893	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
161–163 (3 boats)	St. Nazaire..	1892	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
164–166 (3 boats)	La Seyne ..	1892	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
167–169 (3 boats)	Creusot ..	1892	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
170, 171 (2 boats)	Normand ..	1893–4	118	13·2	8·7	2	79	1,300	23–24	2–1 prs.	2	21	10
172–176 (5 boats)	Normand ..	1893–4	118	13·2	8·7	2	79·5	1,390	23–24	2–1 prs.	2	21	10
177–179 (2 boats)	Havre.. ..	1893	118	13·2	8·7	2	79·5	1,300	23–24	2–1 prs.	2	21	10
180, 181 (2 boats)	Creusot ..	1893–4	118	13·2	8·7	2	79·5	1,300	23	2–1 prs.	2	21	10
'82–191 (10 boats) ..	Normand, etc.	1893–4	118	13·2	..	..	79·5	..	24	..	2	21	10
92–200 (9 boats)	Havre, etc.	1894–5	118	13·2	8·7	2	79·5	1,300	23·5	2–1 prs.	2	21	10
01–205 P25–26 (7 boats)	..	Bldg.	121·4	13·6	..	2	85	1,500	23·5	2–1 prs.	2	23	10
SECOND CLASS—													
26	..	1878	108	11	5·6	1	45	400	19	2–1 prs.	2	16	10
27	..	1878	104·4	10·6	6·1	1	44	400	19	2–1 prs.	2	16	10

France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
SECOND CLASS—*continued.*													
28	..	1878	111·5	11	5·6	1	44	400	19	2–1 prs.	2	16	10
60–64 (5 boats)	..	1878–85	108·2	10·3	6·1	1	45	400	19	2–1 prs.	2	16	10
65, 66, 68 (3 boats) ..	..	1878–85	108·2	10·7	6·4	1	49	500	20	2–1 prs.	2	16	10
69–74 (6 boats)	..	1878–85	108·2	10·7	6·5	1	50	500	20	2–1 prs.	2	16	10
75–109 (35 boats)	Cail, etc. ..	1885–92	114·7	10·6	6	1	56	525	20	2–1 prs.	2	16	10
111–125 (12 boats) ..	La Seyne, etc.	1885–90	114·7	10·6	6	1	56	525	20	2–1 prs.	2	16	10
130–144 (15 boats) ..	Normand, etc.	1889–90	111·5	11·4	6	1	52·8	520	21	2–1 prs.	2	16	10
150	..	..	114·7	10·6	7	1	54	520	20	2–1 prs.	2	16	10
Q. 1–Q. 4. (4 boats) ..	..	Bldg.	..	..	..	1	53	700	20·5	2–1 prs.	2	16	10
THIRD CLASS—													
8–19 (12 boats)	Various Firms in France and England.	1877–82	86	10·2	5	1	27	200–450	16–19	..	..	10	
20			87	10·8	5	1	33			..	..	10	
22, 23 (2 boats)			87·6	10·4	5·2	1	30			..	..	10	
24, 25 (2 boats)			88·5	10·4	6	1	30			..	..	10	
31, 32 (2 boats)			85·5	10·4	3·8	1	27			..	..	10	
33–36 (4 boats)			89	10·4	6	1	32			..	..	10	
37–40 (4 boats)			87	10·8	5	1	32			..	..	10	
41, 42 (2 boats)			87	10·8	6	1	33			..	..	10	
43, 44 (2 boats)			89	10·4	5·7	1	32			..	..	10	
47			87	10·8	5	1	33			..	..	10	
48			89	10·4	5·8	1	32			..	..	10	
49, 50, 53 (3 boats) ..			87	10·8	5	1	32			..	..	10	
54, 55 (2 boats)			91	10	6·1	1	32			..	..	10	
VEDETTE BOATS—													
(1 boat) (aluminium)..	Poplar ..	1894	62·3	9·1	..	1	14	210	20·5	..	1	8	
(6 boats) (aluminium)	France ..	Bldg.	59	9·4	4·8	1	14	210	15·3	..	1	8	
29, 30 (2 boats)	Chiswick ..	1876	67	8·5	3·5	1	16	..	18	..	1	8	
56, 57 (2 boats)	Chiswick ..	1879	59	7·5	3·5	1	12	50	16	..	1	8	
58, 59 (2 boats)	Chiswick ..	1881	63	7·5	3·5	1	11	50	17	..	1	8	
A B..	Creusot ..	1894	62·4	8·9	4·9	1	15	210	16·5	..	1	9	
SUBMARINE—													
Gustave Zédé	Toulon ..	1893	131	..	..	1	266	720	14	..	1	8	
Gymnote	Mourillon ..	1888	59	5·9	5·9	1	29·5	60	4–6	..	..	4	
Morse..	Cherbourg ..	Bldg.	168	..	..	..	146	..	13	..	1	9	

The Lansquenet, sea-going boat, never having realised her contract speed (26 knots), was returned to her builder, June 1895.

Germany.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
DIVISION BOATS—													
D 1, D 2 (2 boats)	Elbing ..	1887	185·3	21·6	9·8	2	250	1,800	21	6 1-pr. revs.	3	48	50
D 3, D 4 (2 boats)	Elbing ..	1888	184	21·8	9·6	2	300	2,000	21	{ 4 6-pr. Q.F. 2 1-pr. revs. }	3	48	90
D 5, D 6 (2 boats)	Elbing ..	1888–9	190	23	9·6	2	320	3,500	23	{ 4 6-pr. Q.F. 2 1-pr. revs. }	3	48	90
D 7, D 8 (2 boats)	Elbing ..	1890	213	..	..	2	350	4,000	26	6 Q.F.	3		
D 9, D 10 (2 boats)	Elbing ..	1894	..	..	..	2	380	..	26	6 Q.F.			
D 11	..	1894											
FIRST CLASS—													
S 1—S 64 (63 boats)*	Elbing ..	1883–90	{128 121·2	15·7 15·6	6·7 6·7}	..	85–88	1,000	19–22	2 1-pr. revs.	2	..	17
S 65—S 74 (10 boats)	Elbing ..	1891–2	144·3	16·4	..	..	110	1,500	24	..	3		
S 75	Elbing ..	..	..	..	..	2	145	..	26	..	3		
S 76—S 80 (5 boats)	Elbing ..	1891–2	144·3	16·4	..	2	125	2,500	25	..	3		
S 81—S 96 (16 boats)	Elbing ..	1893–4	..	..	..	2	110–50	..	26	..			
8 boats	Elbing ..	Bldg.	144·3	18	..	2	140	1,500	22	2 1-pr. revs.	3	..	30
V 1, V 2 (2 boats)	Stettin ..	1884	124·6	..	..	..	} 75	550 }	..	..	2		
V 3, V 4 (2 boats)	Stettin ..	1884	..	..	..	..	} 90	1,000 }	..	..	2		
V 5—V 10 (6 boats)	Stettin ..	1884	..	..	..	..			19	..	2		
G 1,	Gaarden ..	1885	124·6	15·7	6·6	..	88	1,000	19	2 1-pr. revs.	2	17	
Y 1,	Poplar ..	1884	120	12·5	5·5	1	65	650	19	2 1-pr. revs.	2	15	25
T 1, T 2 (2 boats)	Chiswick, &c.	1884	117·7	12·5	6·2	1	80	..	20·2	2 1-pr. revs.	2	15	22
H 1,	Kiel (Howaldt)	1886	..	..	..	..	80	1,000	20	2 1-pr. revs.	2		
K 1,	Kiel (Dockyard)	1887	118·1	13·4	5·9	..	85	1,000	22	2 1-pr. revs.	..	18	
SECOND CLASS—													
W 3—W 6 (4 boats)	Bremen ..	1884	103	12·8	..	..	..	650	18·5	2 1-pr. revs.	2	14	13
3 boats	..	1893	..	..	..	..	88	..	22				
2 boats	..	1893	..	..	..	..	90	..	3				
VEDETTE BOATS—													
13 boats	..	..	..	..	..	..	13·5	..	18				
2 boats	..	..	..	..	..	..	..	..	16				
1 boat	Chiswick ..	1884	63	8	4·3	1	..	..	15·5	1 mach.	2		

* S 41 lost 1895.

Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
6 boats	Stettin ..	1885	128	15·3	5·4	1	85	1,050	19	4 1-pr. revs.	..	20	20
6 boats	Poplar.. ..	1881	100	12	4·2	1	48	600	19	2 1-pr. revs.	2	12	9
4 boats	La Seyne ..	1880	72	13	5·5	1	52	225	..	..	..	..	10
5 boats	La Seyne ..	1881	89	11	3·1	1	35	500	17·5	..	..	..	5
2 boats	Poplar.. ..	1878	75	10·8	2·5	..	18	295	16·2	..	..	..	1·5
8 boats	..	..	..	..	..	..	21	..	16				
20 boats	Various ..	..	..	..	..	..	..	..	..	..	sp.	..	..

Italy.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
5 boats	Elbing ..	1888	152	17·2	7·9	2	130	2,200	26·6	2 3-pr. Q.F., 1 1-pr. Q.F., 1 1-pr. rev.	3	24	40
Nos. 78, 79 (2 boats)	Venice ..	1887	135	14	5·3	2	110	1,600	24	1 1-pr. Q.F., 1 1-pr. rev.	5	20	30
SECOND CLASS—													
Nos. 76, 77 (2 boats)	Poplar.. ..	1887	140	14	5	2	100	1,600	25	2 3-pr. Q.F., 1 1-pr. rev.	5	20	30
Nos. 84–104, 106–111 (27 boats)	Elbing and Italy ..	1887–88	127·7	15·6	6·8	1	85	1,000	22·5	2 1-pr. Q.F.	2	17	7
Nos. 112-116, 118-135 (23 boats)	Elbing and Italy ..	1889–92	127·7	15·6	6·8	1	85	1,100 / 1,200	23	..	2	17	17
No. 117	..	1895	131·2	16·4	..	1	85	1,000	..	2 1 pr. Q.F.	2	17	17
Nos. 136–146 (11 boats)	Italy	1893–94	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 147–153 (7 boats)	Italy ..	1894–5	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
12 boats	Italy	Bldg.	131·2	16·4	7	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 56–75 (20 boats)	Elbing and Italy ..	1885–87	127·7	15·6	6·8	1	65	1,000	22·5	2 1-pr. Q.F.	2	17	17
THIRD CLASS—													
No. 22	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	10
No. 25	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	10
Nos. 26–55 (30 boats)	Chiswick and Italy ..	1882–86	100	11·7	5·3	1	34	430	21·3	1 1-pr. rev.	2	11	7
Nos. 80–83 (4 boats)	Genoa.. ..	1888	101·6	..	..	1	34	430	21	1 1-pr. rev.	2	11	7
Nos. 23, 24 (2 boats)	Chiswick ..	1881	92	10·5	4·9	1	33	470	21·8	1 1-pr. rev.	2	11	7
No. 11	..	1883	..	..	..	1	31	250	..	..	..	10	
FOURTH CLASS.													
Veloce	Chiswick ..	1878	76	10	3·5	1	..	..	18	1 1-pr. rev.	..	10	
Nos. 1, 2 (2 boats)	Poplar.. ..	1879	86	11	4·5	1	25	420	21	..	..	10	7
Nos. 3–10, 16–18, 20, 21 (13 boats)	Chiswick ..	1883	63	7·5	2·5	1	13	170	16·5–17	1 1-pr. rev.	2	10	
Nos. 12–15 (4 boats)	Chiswick ..	1883	66	..	3·8	1	16	250	19·2	1 1-pr. rev.	2	10	
14 boats	E. Cowes ..	..	..	..	..		8–14	..	12–16	..	..	..	
SUBMARINE—													
Pullino	..	1893	..	..	..	..	..	..	8				
Audace	..	bldg.	28·6	11·3	7·0	..	..	..	..	..	..	..	..
Delfino	Spezia.. ..	1895	49·0	..	..	..	..	..	10·0	..	..	..	..

A torpedo destroyer of 28 knots ordered at Sestri Ponente.
No. 19 lost on Lago Maggiore, 1895.

Japan.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Kotaka	Poplar.. ..	1886	170	19·6	5	2	190	1,400	19	4 mach.	6	..	50
14 boats*	Creusot ..	1889	114·7	10·6	6	1	56	525	20	2 1-prs.	..	16	
7 boats	Kobe	1889	114·7	10·6	6	1	56	525	20	2 1-prs.	..	16	
4 boats	Poplar.. ..	1879	100	12·5	..	1	40	620	20	..	..	..	3
1 boat	Normand ..	1891	118	13·2	8·7	2	75	1,300	23	2 1-prs.	2	21	10
2 boats	Elbing ..	1891	125	16	..	1	90	1,300	23	3 1-prs.	3		24
10 boats	Kobe	Bldg.	..	..	..	..	..	..	..	..	..	..	..

* No. 16 lost off the Pescadores, 1895.

Mexico.

Mexico has five first-class boats building or projected.

Netherlands.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Ardjoeno	Poplar.. ..	1886	125	13	6	1	83	800	21	2 1 prs	2	16	10
Batok	Amsterdam	1887	125	13	6·9	1	83	725	20	2 1-prs.	2	16	10
Cycloop	Amsterdam	1887	125	13	6·9	1	83	680	20	2 1-prs.	2	16	10
Dempo	Amsterdam	1887	125	13	6·9	1	83	760	20	2 1-prs.	2	16	10
Empong	Poplar.. ..	1888	128	13	6·2	1	91	1,100	24·1	2 1-prs.	3	16	15
Etna	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Foka	Amsterdam	1888	128	13	6·2	1	90	1,000	22·1	2 1-prs.	3		
Goentoer	Amsterdam	1888	128	13	6·2	1	90	950	21	2 1-prs.	3		
Habang	Amsterdam	1888	128	13	6·2	1	90	930	21·7	2 1-prs.	3		
Hekla	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Idjen	Amsterdam	1889	128	13	6·2	1	90	840	20·6	2 1-prs.	3		
Krakatau	Amsterdam	1889	128	13	6·2	1	90	750	19·1	2 1-prs.	3		
Lamongan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Makjan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Nobo	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
13 boats	..	pro.	160	..	..	..	..	..	..	..	..	..	..
4 boats	..	pro.	100	..	..	..	..	..	..	..	..	..	..
SECOND CLASS—													
Nos. 1, 2, 4–20 (19 boats)	Chiswick, etc.	1878–86	76 / 79	10·3	5·2	1	29	250	18	1 1-pr.	2 sp	..	3
Nos. 3,21,2 (3 boats)	..	1890	83·6	10·5	5·1	1	37	460	17·9	1 1-pr.	1	..	3
1 boat	East Cowes	1883	45·5	9·7	..	1	..	..	12	1 mach.	1		
INDIAN FLEET—													
Cerberus	Flushing ..	1888	125	13	6·9	1	83	912	21·2	2-1 prs.	2	16	
1 boat	..	1891											
3 boats	..	1893-94	125	..	..	..	83	..	21·5	..	2		

Norway.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Lyn	..	1882	94·2	9·7	2·5	1	36	430	18	..	1	..	3
Od	..	1882	97·5	11	5·6	1	40	450	18	..	1	..	3
Orm, Otter (2 boats)	..	1887	108·2	12·2	5·6	1	40	500	20	..	2	..	3
Pil, Rask (2 boats)..	..	1887	101·7	11·8	5·6	1	40	500	20	..	2	..	3
Snar	..	1887	104·9	11·8	5·6	1	40	500	20	..	2	..	3
Springer	..	1887	97·5	11·6	5·6	1	40	450	19	..	2	..	3
Varg (8), Raket (9)	Christiania..	1894	111·5	12·4	..	..	43	..	..	..	2	..	..
SECOND CLASS—													
Rasp	Chiswick ..	1873	58	7·5	3·9	1	16	..	18	..	2		
Ulven	..	1878	56	..	..	1	16	..	9	..	sp.		
2 boats	..	..	..	..	..	..	20	..	12	..	..		

Three boats have been ordered at Elbing, 23 knots speed.

Portugal.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
5 boats (5–9)	Elbing ..	1890–92											
Espadarte (1)	Poplar.. ..	1881	86	11	5	1	31	450	19·7	2 mach.	2	10	10
Nos. 2, 3, 4 (3 boats)	Poplar.. ..	1886	120	12·5	5·5	1	60	700	20	2 mach.	2	16	18
Fulminante	Blackwall ..	1880	75	15	2·6	2	40	150	11·5	2 mach.	..	..	8
1 boat	..	..	..	..	..	..	25						
Mineiro	Lisbon ..	1893	..	..	..	..	..	..	12				
SUBMARINE—													
Plongeur	..	1892	72·1	11·5	..	..	..	..	6				

Roumania.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Naluka	Havre	1888	120·7	11·3	6·9	1	55	500	21	1 1-pr. rev	2	..	12
Sborul	Havre	1888	120·7	11·3	6·9	1	..	500	21	1 1-pr. rev.	2	..	12
Smeul	Havre	1888	120·7	11·3	6·9	1	..	500	21	1 1-pr. rev.	2	..	12
SECOND CLASS—													
Szimul	Poplar.. ..	1882	63	8	3	1	15	150	16·5	..	..	8	1
Vulturul	Poplar.. ..	1882	63	8	3	1	15	150	16·5	..	..	8	1

Russia.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
BALTIC SEA.													
DESTROYER—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Sokol	Poplar.. ..	1895	190	18·6	7.0	2	240	4,400	29.7	1 12-pr. 3 6-pr.	2	..	60
FIRST CLASS—													
Aspen	Kolpiro ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Abo	Elbing ..	1886	128	15·7	7·5	1	87	900	22·2	4 1-pr. revs.	2	13	17
Bjerke	Putiloff ..	1890	136·5	13	7·8	..	81	1,100	21				
Borgo	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Dago	Abo	1891	152	13	8·3	..	100	1,000	19				
Domeness	Putiloff ..	1895	127 9	15·7	6·9	1	98	1,250	21	..	2	..	17
Eckness	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Hapsal	Putiloff ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Hogland	Itschora ..	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Kotka	Abo	1891	152	13	8·3	..	100	1,000	19				
Kotlinj	St. Petersburg	1885	124·2	12·9	5·9	2	67	500	16·5	2 1-pr. revs.	2	16	15

Russia—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—*contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Kronschlot	Kolpiro ..	1891	152	13	8·3	..	100	1,000	19				
Lachta	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Libawa	Elbing ..	1886	128	15·7	7·5	1	87	1,000	22	4 1-pr. revs.	2	13	17
Louga	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Moonsund	Putiloff ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Nargen	Itschora ..	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Narwa	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Pernoff	Normand ..	1892	138	14·7	9·9	2	118	..	25·4	2 mach.	2	26	
Revel	Normand ..	1886	152·3	12·3	8·1	1	96	780	22	2 Q.F.	2	23	30
Rochensalm	Putiloff ..	1890	136·5	13	7·8	..	81	1,100	21				
Seskar	Kolpiro ..	1891	152	13	8·3	..	100	1,000	19				
Sestoresk	Normand ..	1893	118	13·2	8·7	2	130	1,900	25	2 1-prs.	2	21	10
Sweaborg	Normand ..	1886	152·3	12·3	8·1	1	96	780	19·7	2 Q.F.	..	..	30
Tosna	Potiloff ..	1893	127·9	15·7	6·9	1	98	1,250	21	..	2	13	17
Transund	Kolpiro ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Viborg	Clydebank ..	1886	144·5	17	8·1	2	126	1,400	20	2 3-pr. revs.	3	24	45
Vindawa	Elbing ..	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Vzriw	St. Petersburg	1877	118	16	10·9	1	160	800	14·5	4 Q.F.	1	18	16
8 boats	St. Petersburg	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
2 boats	Putiloff ..	1894	138	14·7	9·9	2	118	..	25	2 mach.	2	26	
2 boats	St. Petersburg	Bldg.	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
6 boats	St. Petersburg	Bldg.	138	14·7	9·9	2	118	..	25	..	2	26	
*8 boats	Russia.. ..	Bldg.	..	..	..	..	120						
SECOND CLASS—													
21 boats (Galka class)	Elbing and Russia ..	1880 &c.	74·7	8·9	5	1	30	220	16	..	2	14	3
21 boats (Woron class)	Elbing and Russia ..	..	66	11·1	..	1	..	260	17				
1 boat	Poplar.. ..	1888	60	8·5	3	1	16	240	17·5	..	2	..	1
BLACK SEA.													
FIRST CLASS—													
A. B. C. (3 boats) ..	Nicolaieff ..	1893	126	..	..	..	81	..	21				
Adler..	Elbing ..	1890	152·0	17·2	7·9	2	130	2,200	27·4	2 1-prs.	3	24	40
Anakria	Elbing ..	1890	128·0	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Anapa	Odessa.. ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Aitodorj	Odessa.. ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Batoum	Poplar.. ..	1880	100	12·5	5·5	1	40	500	22	2 1-pr. revs.	2	12	9
D. E. (2 boats) ..	Sebastopol ..	1893	128	..	..	..	85	..	22				
Gagri	Claparède ..	1883	120·6	13·3	7	1	78	600	18	2 1-pr. revs.	2	13	12
Gelendshik	La Seyne ..	1883	122·7	12·4	6·2	1	73	560	18	2 1-pr. revs.	2	13	11
Ismail	Nicolaieff ..	1886	128	15·7	7·5	1	87	900	20	2 1-pr. revs.	2	13	17
Itzvar	Odessa.. ..	1891	..	..	..	..	81	1,100.					
Kodor	Elbing ..	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Kilia	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Novorossisk	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr revs.	2	13	17
Poti	Normand ..	1883	124·6	11·9	6·7	1	72	570	18·5	2 1-pr. revs.	2	13	11
Reni	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Sookhoum	Chiswick ..	1883	113	12·5	6	1	64	700	19.5	2 Nords.	2	13	10
Tchardak	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Yalta..	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
4 boats	Nicolaieff ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
SECOND CLASS—													
Istcheritza	Sebastopol ..	1878]	62·3	9·7	3·9	1	24	220	15	..	..	10	
Karabin	Elbing.. ..	1877	64·3	8·4	2	1	11	120	15	..	..	8	
Kefal..	Chiswick ..	1880	60·5	7·5	3·5	1	..	..	16·8	..	..	8	
Scheglensk	Sebastopol ..	1878	59·3	9·5	3·9	1	24	220	15	..	..	10	
Schehouka	Sebastopol ..	1878	59·3	9·5	3·9	1	24	220	15	..	..	10	
Scoombia	Odessa.. ..	1878	64·3	10	4	1	25	220	15	..	..	10	
Soroka	St. Petersburg	1878	62.3	9·7	3·9	1	24	220	15	..	..	10	
Soulin	..	1877	60	9·7	3·9	1	24	210	15	..	..	10	
Sultanka	Odessa.. ..	1878	64·3	10	4	1	25	220	15	..	..	10	
1 boat	Poplar	1877	75	10	..	..	..	..	..	..	..	..	
50 boats (Woron Class)	Elbing, etc.	..	66	11·1	..	1	..	260	17				
SIBERIAN FLOTILLA.													
Forel..	..	..	71·5	6·5	3·3	1	23	220	16				
Jantchiche	Elbing.. ..	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
Podorosnik	..	..	71·5	6·5	3·3	1	23	220	16				
Sisik	..	..	71·5	6·5	3·3	1	23	220	16				
Skorpion	..	..	71·5	6·5	3·3	1	23	220	16				
Sootchena..	Elbing.. ..	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
Sterliad	..	..	71·5	6·5	3·3	1	23	220	16				
Strauss	..	..	71·5	6·5	3·3	1	23	220	16				
Sunguri (*ex* Hogland)	Abo	1890	152	16	7·9	2	140	1,800	22				
Ussuri (*ex* Nargen)	Abo	1890	152	16	7·9	2	140	1,800	22				

* Of the Pernoff type, building on the Neva.
A new Sokol has been ordered at Abo, and others are projected.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Acevedo	Chiswick ..	1885	117·7	12·5	6·2	1	63	660	20·1	2 mach.	2		
Ariete	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	26·1	4 3-pr. Q.F.	2	..	25
Azor	Poplar.. ..	1887	134·5	14	6	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Barcelo	Normand ..	1886	126	10·9	..	..	66	800	19·5	2 1-in. Nord.	2		
Bustamente	Normand ..	1887	126	10·9	..	..	63	800	..	3 3-prs.	2		
Ejercito	Kiel	1887	111·5	13	3·3	..	60	1,000	25	2 mach.	2		
Habana	Chiswick ..	1887	127·5	12·5	6	1	59	730	21·3	1 mach.	2		
Halcon	Poplar.. ..	1887	134·5	14	..	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Julian Ordoñez ..	Chiswick ..	1885	117·7	12·5	6·2	1	65	660	20·1	2 1-in. Nord.	2		
Orion..	Gaarden ..	..	125	15·5	3·5	1	85	1,000	21·5	2 1-pr. revs.	2	18	16
Rayo..	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	25·5	4 3-pr. Q.F.	2	..	25
Retamosa..	Poplar.. ..	1886	118	12·5	5·5	1	70	700	20·5	2 1-in.	2	17	20
Rigel..	Bremen ..	1883	105	12·3	3·3	1	57	..	19	1 1-pr. rev.	2	18	13
Seza	Ferrol.. ..	1885	126	..	..	..	85	..	14				
4 boats	..	Bldg.	147	43.0	5	..	98	1,600	25			25	25
SECOND CLASS—													
Aire	Spain	1883	43·4	10·2	3	2	25	175	8	1 3·1-in.	..	16	1
Castor	La Seyne ..	1878	76·2	9·7	2·3	..	23	265	19	..	..	14	1·5
Pollux	Poplar.. ..	1879	84·5	10·7	4·6	..	33	450	19·5	..	2	14	9
VEDETTE BOATS—													
3 boats	East Cowes	1892	60	9·3	..	..	..	..	18 3				
Peral..	Carraca ..	1889	70	8·5	..	2	87	60	10				

The Furor and Terror, destroyers, are building at Clydebank, displacement 370 tons; length 220 ft.; beam 22 ft.; draught 5 ft. 6 in.; 2 screws; 28 knots; 80 tons coal capacity: two 75 mm., two 57 mm., two 37 mm. Q.F.; two torpedo boats, couplement 63.

Sweden.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
3 boats	Stockholm ..	1886	114·4	12·4	6·4	1	60	600	18	1 mach.	2	12	15
Hugin (1)	Chiswick ..	1884	113	12·5	6·2	1	65	620	19·2	1 mach.	2	12	11
Nos. 9 (Gondul), 11 (Gudur)	..	1893	..	..	..	..	..	..	..	2 mach.	2		
1 boat	..	Bldg.	..	..	..	..	99						
SECOND CLASS—													
Agda (77)	Carlskrona..	1891	100·4	11·3	5·8	1	40	450	19	1 mach.	2	12	7·5
Agne (75)	Stockholm ..	1891	100·4	11·3	5·8	1	40	450	19	1 mach.	2	12	7·5
Blink (61)	Stockholm ..	1882	91·5	11·7	5·2	1	34	350	16	..	1	10	8
Blixt (63)..	..	1883	100·4	11·6	5·4	1	40	360	18	..	2	12	7
Bygve (71)	Stockholm ..	1889	103·2	11·6	5·8	1	41	360	18	..	2	12	9
Bylgia (73)	Stockholm ..	1889	103·2	11·6	5·8	1	41	360	18	..	2	12	9
Galdr (65)	Stockholm ..	1885	100·4	11·6	5·4	1	40	425	18·5	..	2	12	7·5
Narf (67)..	Stockholm ..	1886	101·2	11·6	5·7	1	40	450	19	..	2	12	7·5
Nörve (69)	Stockholm ..	1886	101·2	11·6	5·7	1	40	450	19	..	2	12	7·5
Rolf	Stockholm ..	1882	91·5	11·7	5·2	1	34	390	17	..	1	10	8
Seid	Chiswick ..	1882	100	12	5	1	40	360	20·7	1 mach.	2	12	8
THIRD CLASS—													
Nos. 141, 143, 145, 147, 149, 151 (6 boats)	Stockholm ..	1879–90	55	10·7	4·1	2	21	80	10	..	2	..	1·5
Glimt (101)	Chiswick ..	1875	58	7·6	3	1	5	60	18	..	2	..	1·5

Turkey.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Berk-Efshan	Gaarden ..	1894	187	21·6	..	2	270	200	25	6 1-pr. revs.	2		
Tajjar	Gaarden ..	1894	187	21.6	..	2	270	..	25	6 1-pr. revs.	2		
FIRST CLASS—													
Edjder (No. 10) ..	Gaarden ..	1890	152·7	18·9	7·4	2	150	2,200	23	5 3-prs. Q.F.	2		
1 boat	Constantinople	1889	140	16	6·9	2	120	1,800	23	5 1-pr. revs.	2		
5 boats	Gaarden ..	1889–90	126·7	15·4	8·6	1	85	1,300	22	2 1-pr. revs.	2	21	8
Timsah	London ..	1887	126	15	..	..	..	..	21·7				
5 boats	Elbing ..	1886–89	120·3	16·2	..	..	85	1,000	21	2 Nords.	2	20	10
4 boats	Constantinople	1886–89	100·3	11·8	5·5	1	42	550	19·5	2 mach.			
Tewfik	Normand ..	1885	100·7	13	5·5	1	42	550	20				
2 boats	La Seyne and Constantinople	1885	100·7	13	5·5	1	42	550	20·3	2 Nords.			
10 boats	Elbing ..	1890 & 1895	125	16·5					19				
2 boats	Teddington	1887	124	15	..	..	..	..	22				
2 boats	Kiel	1892	127	..	..	..	..	..	22				
SUBMARINE—													
Abdul Hamid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8
Abdul Medjid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8

United States.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
Cushing	Bristol, R.I.	1890	138·9	14·1	5·3	2	116	1,720	22·5	2 3-pr. Q.F.	3	21	
Ericsson	Dubuque, I.	1892	150	15·6	4·9	2	120	1,800	23	4 3-pr. Q.F.	3	21	40
3 boats	Philadelphia	Bldg.	159	16·9	5·0	2	135	2,000	24·5	4 3-pr. Q.F.	3	..	50
3 boats	..	Bldg.	170	17	5·5	2	185	3,500	27·5	4 1-pr. Q.F.	3		
SECOND CLASS—													
Stiletto	Bristol, R.I.	1886	88·6	11	3	1	30	350	18·2	..	2	..	6
VEDETTE BOATS—													
2 boats	New York	1895	61·7	9	..	1	15	..	18	1 1-pr.	1	..	1
2 boats	Norfolk, Va.	1895	50	9	..	1	12	..	17	1 1-pr.	1	..	·75
SUBMARINE—													
1 boat	New York	Bldg.	80	10·6	..	2	150	1,200	8·15				

Comparative Tables of British, French, Russian, Italian, and German Ships.

NOTE.—*Displacements of Foreign Ships are given in metric tons.*

TABLE I.—FIRST-CLASS BATTLESHIPS.

ENGLAND.			FRANCE.			RUSSIA.			ITALY.			GERMANY.		
Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.
		Metric tons			Metric tons			Metric tons			Metric tons			Metric tons
1886	Anson	10,600	1883	Baudin	11,380	1886	Catherine II.	10,180	1885	Andrea Doria	11,000	1891	Brandenburg	10,100
1893	Barfleur	10,500	1879	Duperré	10,487	1892	Georgi		1880	Italia	14,387	1891	Kurfürst Fried.	
1885	Benbow	10,600	1891	Brennus	11,000		Pobiedonosets	10,280	1883	Lepanto	14,400		Wilhelm	10,100
1885	Camperdown	10,600	1881	Courbet	9,652	1891	Navarin	9,476	1884	Lauria	11,000	1891	Weissenburg	10,100
1892	Centurion	10,500	1879	Dévastation	9,639	1887	Sinope	10,180	1885	Morosini	11,000	1892	Wörth	10,100
1882	Collingwood	9,500	1885	Formidable	11,441	1886	Tchesmé	10,180	1888	Re Umberto	13,298		*Ersatz Preussen*	11,000
1891	Empress of India	14,150	1886	Hoche	10,650	1894	*Petropavlovsk*	10,960	1890	Sardegna	13,860			
1891	Hood	14,150	1890	Magenta	10,600	1894	*Poltava*	10,960	1891	Sicilia	13,298			
1885	Howe	10,300	1887	Marceau	10,581	1895	*Sevastopol*	10,960		*E. Filiberto*	9,800			
1894	Magnificent	14,900	1887	Neptune	10,630	1892	*Tri Sviatitelia*	12,480		*St. Bon*	9,800			
1895	Majestic	14,900		*Bouvet*	12,205		*Peresviet*	12,674						
1888	Nile	11,940	1894	*Carnot*	12,008		*Oslabya*	12,674						
1892	Ramillies	14,150	1893	*Charles Martel*	11,880									
1895	Renown	12,350	1895	*Charlemagne*	11,275									
1892	Repulse	14,150		*Gaulois*	11,275									
1892	Resolution	14,150	1893	*Jauréguiberry*	11,824									
1892	Revenge	14,150	1895	*Masséna*	11,924									
1884	Rodney	10,300		*St. Louis*	11,275									
1892	Royal Oak	14,150												
1891	Royal Sovereign	14,150												
1887	Sans Pareil	10,470												
1887	Trafalgar	11,940												
	Cæsar	14,900												
	Hannibal	14,900												
	Illustrious	14,900												
1895	*Jupiter*	14,900												
1896	*Mars*	14,900												
1895	*Prince George*	14,900												
1895	*Victorious*	14,900												
	Total 29 Ships*			Total 18 Ships			Total 11 Ships			Total 10 Ships			Total 5 Ships†	

* 5 projected. † 1 projected.

TABLE II.—SECOND-CLASS BATTLESHIPS.

ENGLAND.			FRANCE.			RUSSIA.			ITALY.			GERMANY.		
Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.
		Metric tns.			Metric tns.			Metric tns.			Metric tns.			Metric tns.
1879	Agamemnon ..	8,660	1892	Bouvines .	6,610	1887	Alexander II.	8,440	1878	Dandolo ..	11,202	1880	Baden	7,400
1880	Ajax	8,660	1885	Caiman	7,640	1890	Dvenadsat Apostoloff ..	8,076	1876	Duilio	11,138	1878	Baiern	7,400
1875	Alexandra ..	9,490	1875	Colbert * .	8,457							1874	Deutschland ...	7,676
1882	Colossus	9,420	1873	Friedland ..	8,824	1890	Gangoot	6,592				1874	Kaiser	7,676
1871	Devastation ..	9,330	1883	Indomptable ..	7,635	1889	Nicolai I. ..	8,440				1884	Oldenburg ..	5,200
1875	Dreadnought ..	10,820	1876	Redoutable ..	8,860	1872	Peter Veliky ..	8,750				1877	Sachsen	7,400
1882	Edinburgh ..	9,420	1885	Requin	7,879		*Rostislav*	8,880				1878	Württemberg..	7,400
1876	Inflexible ..	11,880	1873	Richelieu * ..	8,767		*Sissoi Veliky* ..	8,880						
1874	Neptune	9,310	1881	Terrible	7,820									
1875	Superb	9,170	1873	Tréhouart ..	6,610									
1876	Téméraire ..	8,540	1876	Trident * ..	8,456									
1872	Thunderer ..	9,330												
	Total 12 Ships.			Total 11 Ships. †			Total 7 Ships.			Total 2 Ships.			Total 7 Ships.	

* These ships are built of wood. † One, the Henri IV. projected.

Table III.—Third-Class Battleships.

ENGLAND.			FRANCE.			RUSSIA.			ITALY.			GERMANY.		
Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.
		Metric tns.			Metric tns.			Metric tns.			Metric tns.			
1869	Audacious ..	6,010	1870	Suffren*	7,782	Nil.	Nil.	Nil.	1865	Affondatore ..	4,062	1874	Friedrich der Grosse ..	6,770
1865	Bellerophon ..	7,550	1875	Victorieuse* ..	4,700				1864	Ancona	4,460	1868	König Wilhelm	9,757
1881	Conqueror ..	6,200							1863	Castelfidardo ..	4,250	1873	Preussen	6,770
1868	Hercules	8 680							1863	Maria Pia .	4,268			
1885	Hero	6,200							1863	San Martino ..	4,268			
1869	Invincible ..	6,010												
1870	Iron Duke ..	6,010												
1868	Monarch	8,320												
1870	Sultan	9,290												
1870	Swiftsure	6,910												
1870	Triumph	6,640												
	Total 11 Ships.			Total 2 Ships.						Total 5 Ships †			Total 3 Ships.	

* These ships are built of wood.

† These ships, though very old, have all a modern Q.-F. armament.

TABLE IV.—COAST DEFENCE SHIPS.

England			France			Russia			Italy			Germany		
Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.	Lnchd.	Name.	Displacement.
		Metric tns.			Metric tns.			Metric tns.						Metric tns.
1870	Abyssinia * ..	2,900	1885	Achéron	1,640	1868	Adm. Chicagoff	3,511	Nil.	Nil.	Nil.	1878	Basilisk	1,109
1876	Belleisle	4,870	1887	Cocyte	1,640	1868	Adm. Greig ..	3,593				1890	Beowulf	3,500
1870	Cerberus † ..	3,480	1885	Flamme	1,046	1867	Adm. Lazareff	3,556				1876	Biene	1,109
1871	Cyclops	3,560	1877	Fulminant ..	5,651	1868	Adm. Spiridoff	3,500				1878	Camaleon ..	1,109
1871	Glatton	4,910	1883	Furieux	6,000	1867	Charodeika ..	2,026				1879	Crocodil	1,109
1871	Gorgon	3,560	1884	Fusée	1,150	1892	Gremyastchy ..	1,500				1891	Frithjof	3,500
1871	Hecate	3,560	1888	Grenade	1,046	1890	Grosjastchy ..	1,492				1893	Hagen	3,500
1870	Hotspur	4,010	1892	Jemmapes ..	6,590	1873	Novgorod ..	2,706				1892	Heimdall	3,500
1871	Hydra	3,560	1886	Mitraille ..	1,130	1892	Otvazny	1,500				1892	Hildebrand ..	3,500
1870	*Magdala	3,340	1892	Phlégéton ..	1,790	1875	Popoff	3,590				1881	Hummel	1,109
1879	Orion (*a*)	4,870	1892	Styx	1,790	1893	*Adm. Oushakoff*	4,126				1887	Mücke	1,109
1867	Penelope (*b*) ..	4,470	1876	Tempête	4,870	1895	*Adm. Senjavin*	4,126				1880	Natter	1,109
1872	Rupert (*c*) ..	5,440	1880	Tonnant	5,090		*Gen. Adm. Apraxine* ..	4,126				1880	Salamander ..	1,109
			1875	Tonnerre	5,860							1877	Skorpion	1,109
			1877	Triomphante ‡ .	4,700							1889	Siegfried	3,500
			1892	Valmy	6,590							1876	Viper	1,109
			1878	Vengeur	4,710							1876	Vespe	1,109
												1895	*Aegir*	3,500
												1894	*Odin*	3,500
	Total 13 Ships.			Total 16 Ships.			Total 13 Ships. ‖						Total 19 Ships.	

* Indian Marine. † Victorian Marine. ‡ Now *ponton stationnaire* at Saigon.
‖ Kreml, Pervenetz and Netron Menya, which are over 30 years old, omitted.
(*a*) At Malta. (*b*) At Capetown. (*c*) At Gibraltar.

TABLE V.—FIRST CLASS CRUISERS.

ENGLAND.			FRANCE.			RUSSIA.			ITALY.			GERMANY.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Metric tns.	Knots.		Metric tns.	Knots.		Metric tns.	Knots.		Metric tns	Knots.		Metric tns.
12	Achilles	9,820	14	Bayard	5,986	16½	Admiral Nachimoff	7,782	19	Marco Polo	4,583	21	Kaiserin Augusta	6,052
12	Agincourt	10,690	14	Duguesclin	5,894	15½	Dmitri Donskoi	5,893	20	*Carlo Alberto*	6,500	19	*Ersatz Leipzig*	10,300
12	Minotaur	10,690	14	Turenne	6,400	18	Pamyat Azova.	6,000	20	*G. Garibaldi*	6,840			
13	Northumberland	10,780	14	Vauban	6,150	18	Rurik	10,923	20	*Varese* ‖	6,840			
13	Nelson	7,630	19	Bruix	4,745	12	General Admiral	4,604	20	*Vettor Pisani*	6,500			
12	Northampton	7,630	19	Chanzy	4,745	13	Gerzog Edinburgski	4,604	23	(1 unnamed)	10,000			
12	Shannon	5,390	19	Charner	4,745	12½	Kniaz Pojarski	5,007						
16½	Impérieuse	8,400	19	Latouche Tréville	4,745	13	Minin	5,740						
16½	Warspite	8,400	20	Dupuy de Lôme	6,297	17	Vladimir Monomach	5,796						
18	Aurora	5,600	19	Cecille	5,766	18	*Rossia*	12,130						
18	Australia	5,600	19	Tage	7,345									
18	Galatea	5,600	19	*D'Entrecasteaux*	8,114									
18	Immortalité	5,600	23	*Jeanne d'Arc*	11,270									
18	Narcissus	5,600	23	*Chateau Renault*	8,018									
18	Orlando	5,600	23	*Guichen*	8,277									
18	Undaunted	5,600	19	*Pothuau*	5,360									
21½	Blake	9,000												
21½	Blenheim	9,000												
19¾	Crescent	7,700												
20	Edgar	7,350												
20	Endymion	7,350												
19¾	Gibraltar	7,700												
20	Grafton	7,350												
20	Hawke	7,350												
19¾	Royal Arthur	7,700												
19¾	St. George	7,700												
20	Theseus	7,350												
22	*Powerful*	14,200												
22	*Terrible*	14,200												
20½	*Andromeda*	11,000												
20½	*Diadem*	11,000												
20½	*Europa*	11,000												
20½	*Niobe*	11,000												
Total 33 Ships.*			Total 16 Ships.			Total 10 Ships.†			Total 5 Ships.‡			Total 2 Ships.		

* 4 projected. † 2 projected. ‡ 1 projected. ‖ Reported sold to Argentine Republic.

Table V.—Second and Third Class Cruisers.

England.			France.			Russia.			Italy.			Germany.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Metric tns.	Knots.		Metric tns.	Knots.		Metric tns.	Knots.		Metric tns.	Knots.		Metric tns.
19¾	Æolus	3,600	19½	Alger	4,122	17½	Admiral Korniloff	5,000	19	Calabria	2,470	20	Gefion	4,108
17	Amphion	4,300	19¼	Bugeaud	3,740	15½	Pamyat Merkuriya	3,050	19½	Dogali	2,088	20	Irene	4,400
20	Andromache	3,400	19¼	Chasseloup-Laubat	3,753	15	Rynda	2,950	18	Elba	2,720	19	Prinzess Wilhelm	4,400
20	Apollo	3,400	20	Davout	3,027	20	*Svietlana*	3,828	18	Etna	3,530	21	*Ersatz Freya*	5,650
17	Arethusa	4,300	19¼	Friant	3,740				19	Etruria	2,280	21	*K*	5,650
19½	Astræa	4,360	19	Isly	4,160				17½	Fieramosca	3,600	21	*L*	5,650
19½	Bonaventure	4,360	19	Jean Bart	4,160				17½	Giovanni-				
19¾	Brilliant	3,600	20	Linois	2,345				18	Bausan	3,068			
19½	Cambrian	4,360	17	Sfax	4,502				17	Liguria	2,280			
19½	Charybdis	4,360	20	Suchet	3,430				21	Lombardia	2,280			
19½	Flora	4,360	19	*Catinat*	4,065				17	Piemonte	2,500			
19½	Forte	4,360	19	*Cassard*	3,952				19	Stromboli	3,475			
17	Forth	4,050	19	*D'Assas*	3,952				17	Umbria	2,280			
19½	Fox	4,360	19	*Descartes*	3,980				20	Vesuvio	3,427			
19½	Hermione	4,360	19	*Duchayla*	3,952					*Puglia*	2,550			
19¾	Indefatigable	3,600	19	*Protet*	4,113									
19¾	Intrepid	3,600	20	*Galilée*	2,317									
19¾	Iphigenia	3,600	20	*Lavoisier*	2,317									
19	Katoomba	2,575	19¼	*Pascal*	3,988									
20	Latona	3,400												
17	Leander	4,300												
19	Magicienne	2,950												
19	Marathon	2,950												
19	Medea	2,800												
19	Medusa	2,800												
20	Melampus	3,400												
19	Melpomene	2,950												
17	Mersey	4,050												
19	Mildura	2,575												
20	Naiad	3,400												
19	Pallas	2,575												
19	Pearl	2,575												
17	Phaeton	4,300												
19	Philomel	2,575												
19	Phœbe	2,575												
19¾	Pique	3,600												
19¾	Rainbow	3,600												
19¾	Retribution	3,600												
19	Ringarooma	2,575												
20	Sappho	3,400												
20	Scylla	3,400												
17	Severn	4,050												
19¾	Sirius	3,600												
19¾	Spartan	3,600												
20	Sybille	3,400												
19	Tauranga	2,575												
20	Terpsichore	3,400												
17	Thames	4,050												
20	Thetis	3,400												
20	Tribune	3,400												
19	Wallaroo	2,575												
19	*Arrogant*	5,800												
19½	*Diana*	5,600												
19½	*Dido*	5,600												
19½	*Doris*	5,600												
19½	*Eclipse*	5,600												
19	*Furious*	5,800												
19	*Gladiator*	5,800												
19½	*Isis*	5,600												
19½	*Juno*	5,600												
19½	*Minerva*	5,600												
19½	*Talbot*	5,600												
19½	*Venus*	5,600												
19	*Vindictive*	5,800												
20	*Pelorus*	2,135												
20	*Proserpine*	2,135												
	Total 63 Ships.*			Total 19 Ships.			Total 4 Ships.			Total 14 Ships.			Total 6 Ships.†	

* Three second-class and six third-class cruisers projected.

† 2 projected.

Table VII.—Look-Out Ships.

England			France			Russia			Italy			Germany		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Tons.	Knots.		Tons.	Knots.		Tons.	Knots.		Tons.	Knots.		Tons.
17	Alacrity	1,700	19¾	Coëtlogon ..	1,930	Nil.	Nil.	Nil.	Nil.	Nil.	Nil.	16	Blitz	1,382
16½	Archer	1,700	17¾	Condor	1,240							16½	Buzzard	1,850
17¾	Barham	1,830	20½	Cosmao	1,920							16	Condor	1,640
16¾	Barracouta ..	1,500	17	Epervier	1,230							16	Cormoran ..	1,640
16¾	Barrosa	1,580	17½	Faucon	1,240							15½	Falke	1,730
17¾	Bellona	1,830	18	Fleurus	1,310							16	Geier	1,640
16¾	Blanche	1,580	20½	Forbin	1,820							23	Greif	2,000
16¾	Blonde	1,580	20½	Lalande	1,920							19	Jagd	1,250
16½	Brisk	1,770	20½	Surcouf	1,930							16	Pfeil	1,382
16½	Cossack	1,770	20½	Troude	1,920							16	See-Adler ..	1,640
16¾	Fearless	1,580	17½	Vautour	1,240							19	Wacht	1,250
18	Iris	3,730	18½	Wattignies ..	1,310							23	*Hela*	2,000
18	Mercury	3,730												
16½	Mohawk	1,770												
16½	Porpoise	1,770												
17½	Racoon	1,770												
16¾	Scout	1,580												
17	Surprise	1,700												
16½	Tartar	1,770												
	Total 19 Ships.			Total 12 Ships.									Total 12 Ships.	

TABLE VIII.—TORPEDO GUNBOATS.

ENGLAND.			FRANCE.			RUSSIA.			ITALY.			GERMANY.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Tons.	Knots.		Tons.	Knots.		Tons.	Knots.		Tons.	Knots.		Tons.
19	Alarm	810	18½	Bombe	395	20	Captain Sacken	700	20	Aretusa	840	23	Komet	946
19	Antelope.. ..	810	21½	Casabianca ..	960	22	Gaidamak ..	500	20	Calatafimi ..	840	26	2 Division Boats	380
20	Assaye	735	21½	Cassini	945	22	Griden	400	21	Caprera	833	26	2 "	350
20	Boomerang ..	735	18	Couleuvrine ..	395	21	Kazarsky ..	411	17	Confienza ..	768	22	2 "	320
19	Circe	810	18	Dague	395	20	Lieutenant Ilyn	600	20	Euridice	840	21	2 "	300
19	Dryad	1,070	21½	D'Iberville ..	925	22	Posadnik ..	400	20	Folgore	370			
20	Gleaner	735	18	Dragonne ..	395	22	Voevada	400	19	Goito	812			
19	Gossamer ..	735	18	Flèche	380	22	Vzadnik	500	19½	Iride	840			
19	Grasshopper ..	525	18	Lance	395				19	Minerva	846			
19	Halcyon	1,070	18¾	Léger	440				19	Montebello ..	814			
19	Harrier	1,070	18½	Lévrier	440				19	Monzambano ..	840			
19	Hazard	1,070	18	Sainte-Barbe ..	320				19	Partenope ..	840			
19	Hebe	810	18	Salve	320				20	Saetta	400			
19	Hussar	1,070	23	*Dunois*	896				18	Tripoli	848			
19	Jaseur	810	23	*La Hire*	896				20	Urania	846			
20	Jason	810							22	*Agordat*	1,100			
20	Karrakatta ..	735							26	*Coatit*	1,100			
19	Leda	810												
19	Niger	810												
19	Onyx	810												
20	Plassy	734												
18	Polyphemus ..	2,640												
18½	Rattlesnake ..	550												
19	Renard	810												
20	Salamander ..	735												
19	Sandfly	525												
20	Seagull	735												
20	Sharpshooter .	735												
20	Sheldrake ..	735												
20	Skipjack ..	735												
20	Spanker ..	735												
20	Speedwell ..	735												
20¼	Speedy	810												
19	Spider	525												
	Total 34 Ships.			Total 15 Ships.*			Total 8 Ships.			Total 17 Ships.			Total 9 Ships.†	

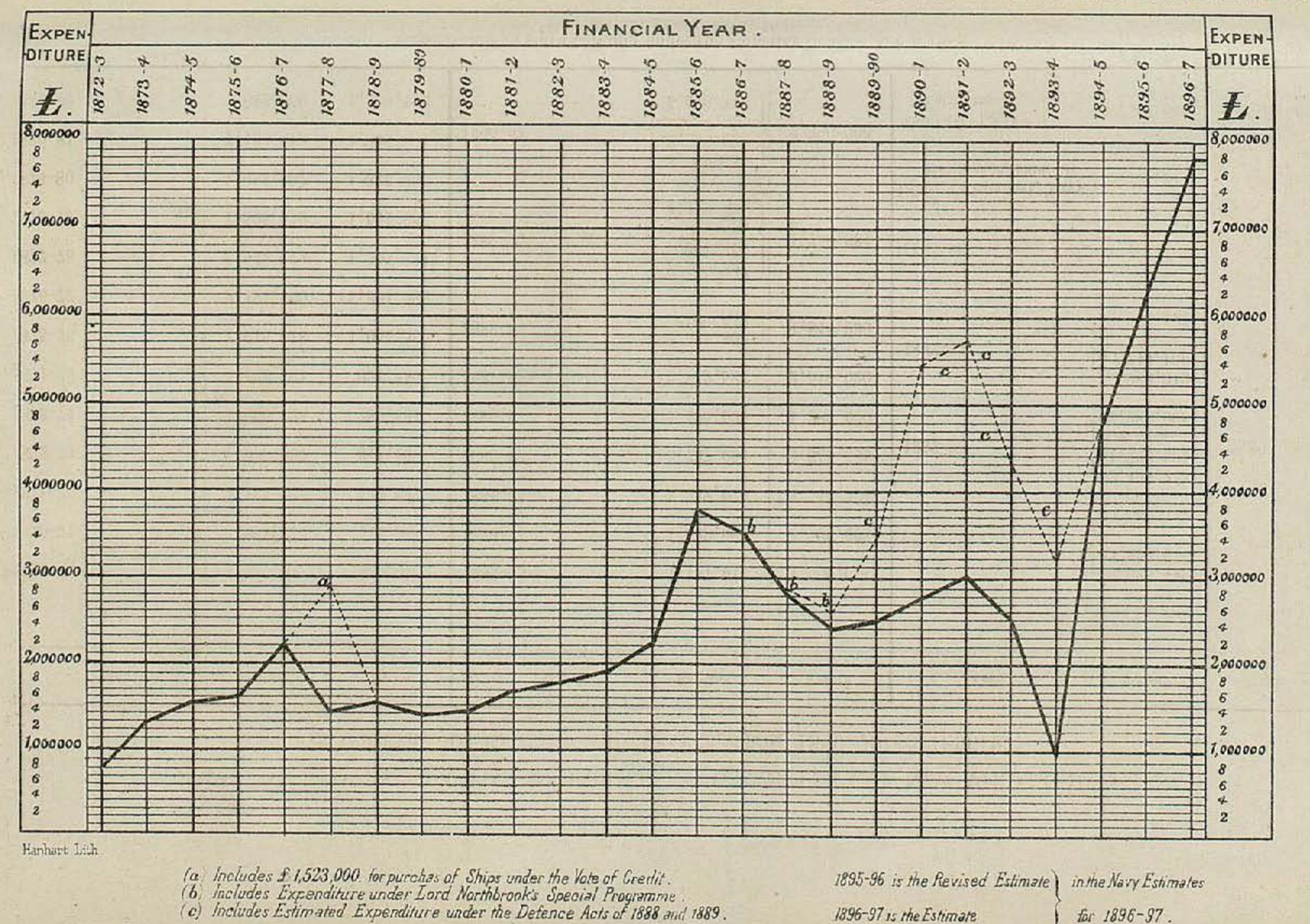
* 1 projected. † 1 projected.

COMPARATIVE STATEMENT SHOWING EXPENDITURE ON CONSTRUCTION OF NEW VESSELS, HULLS AND MACHINERY, IN ENGLAND AND FRANCE, FROM 1869–70 TO 1896–97.

Year.	England.	France.	Year.	England.	France.	Year.	England.	France.
	£	£		£	£		£	£
1869–70	1,387,047	655,016	1882–83	1,767,014	1,559,644	1891–92	3,026,449 a2,653,670 5,680,119	2,800,000
1870–71	1,330,814	411,948	1883–84	1,930,090	1,536,508			
1871–72	1,184,172	429,832	1884–85	2,242,070	1,510,704			
1872–73	809,087	614,460	1885–86	3,737,000	1,355,684	1892–93	2,498,213 a1,788,695 4,286,908	2,800,000
1873–74	1,290,028	789,684	1886–87	3,495,000	1,280,000			
1874–75	1,528,161	921,380	1887–88	2,819,537	2,510,020			
1875–76	1,613,218	1,054,560	1888–89	2,398,805 *190,842	1,848,930	1893–94	980,319 a2,244,106 3,224,425	2,918,120
1876–77	2,121,960	1,301,988						
1877–78	2,922,442	1,501,884	1889–90	2,455,997 a984,314 3,440,311	1,759,684	1894–95	4,768,761	3,049,720
1878–79	1,508,049	1,504,656						
1879–80	1,388,607	1,375,296				1895–96 (Revised) Navy Estimates, 1896–97	6,231,271	3,033,400
1880–81	1,426,349	1,345,084	1890–91	2,769,651 a2,656,695 5,426,346	2,396,000			
1881–82	1,682,500	1,400,152				1896–97 (Navy Estimates) ..	7,765,646	3,106,060

* Expenditure on ships building under the Imperial Defence Act of 1888.
(a) Provided for under Naval Defence Act.

DIAGRAM SHEWING THE EXPENDITURE UPON THE CONSTRUCTION OF NEW SHIPS DURING THE 25 YEARS BETWEEN 1872-73 AND 1896-97.



(a) Includes £1,523,000 for purchase of Ships under the Vote of Credit.
(b) Includes Expenditure under Lord Northbrook's Special Programme.
(c) Includes Estimated Expenditure under the Defence Acts of 1888 and 1889.

1895-96 is the Revised Estimate } in the Navy Estimates
1896-97 is the Estimate } for 1896-97.

Note — *The distance at any point of the drawn line from the base represents on the scale £ s. the ORDINARY expenditure of the year marked by the point. The distance at any point of the dotted line from the base represents on the scale of £ s, both the ORDINARY and the EXTRAORDINARY expenditure of the year marked by that point*

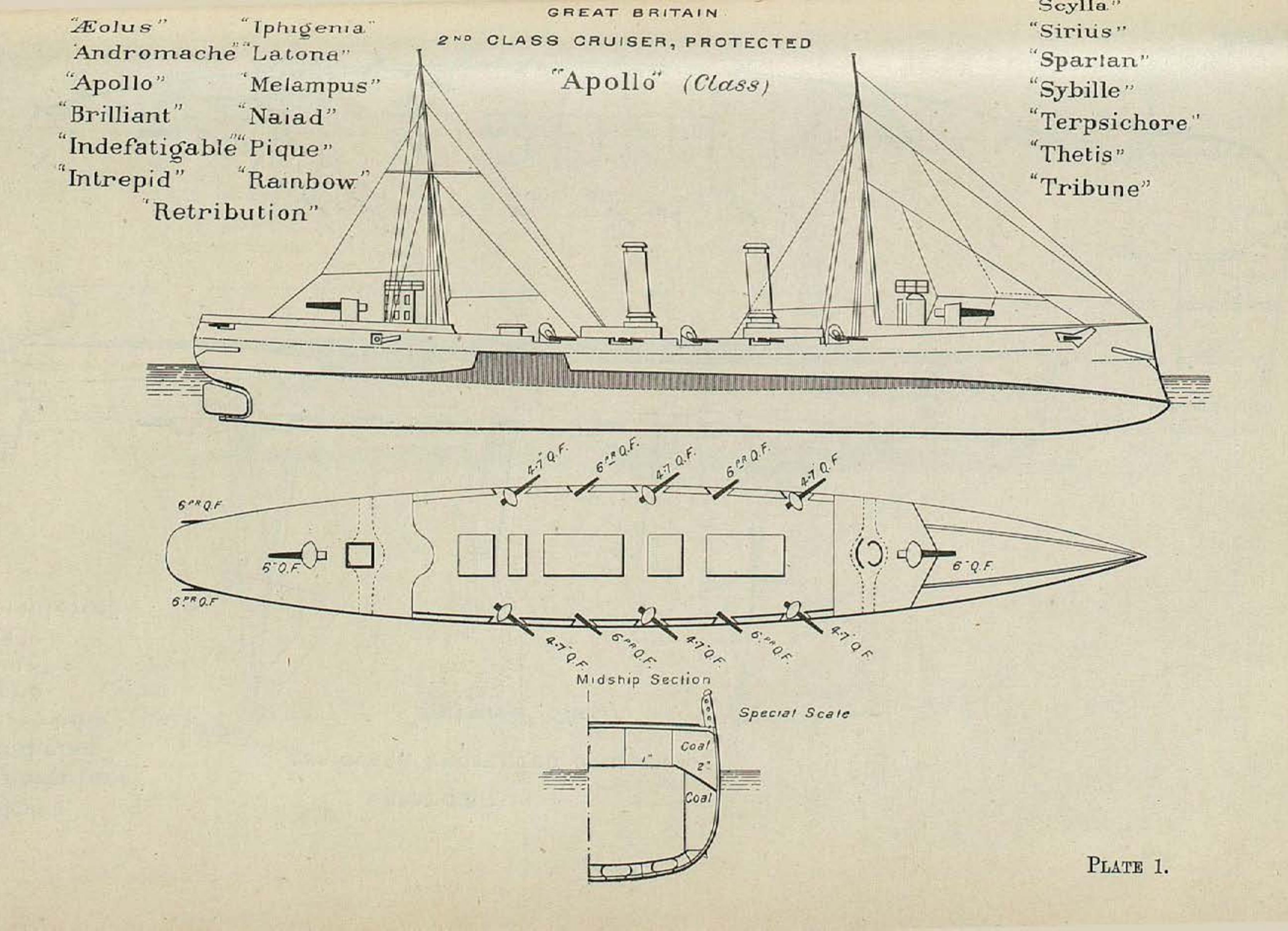

GREAT BRITAIN
2ND CLASS CRUISER, PROTECTED
"Apollo" (Class)
"Æolus"
"Iphigenia"
"Andromache"
"Latona"
"Apollo"
"Melampus"
"Brilliant"
"Naiad"
"Indefatigable"
"Pique"
"Intrepid"
"Rainbow"
"Retribution"
"Scylla"
"Sirius"
"Spartan"
"Sybille"
"Terpsichore"
"Thetis"
"Tribune"
6"Q.F.
6PR Q.F.
4.7" Q.F.
Midship Section
Special Scale
Coal
Coal
1"
2"

PLATE 1.

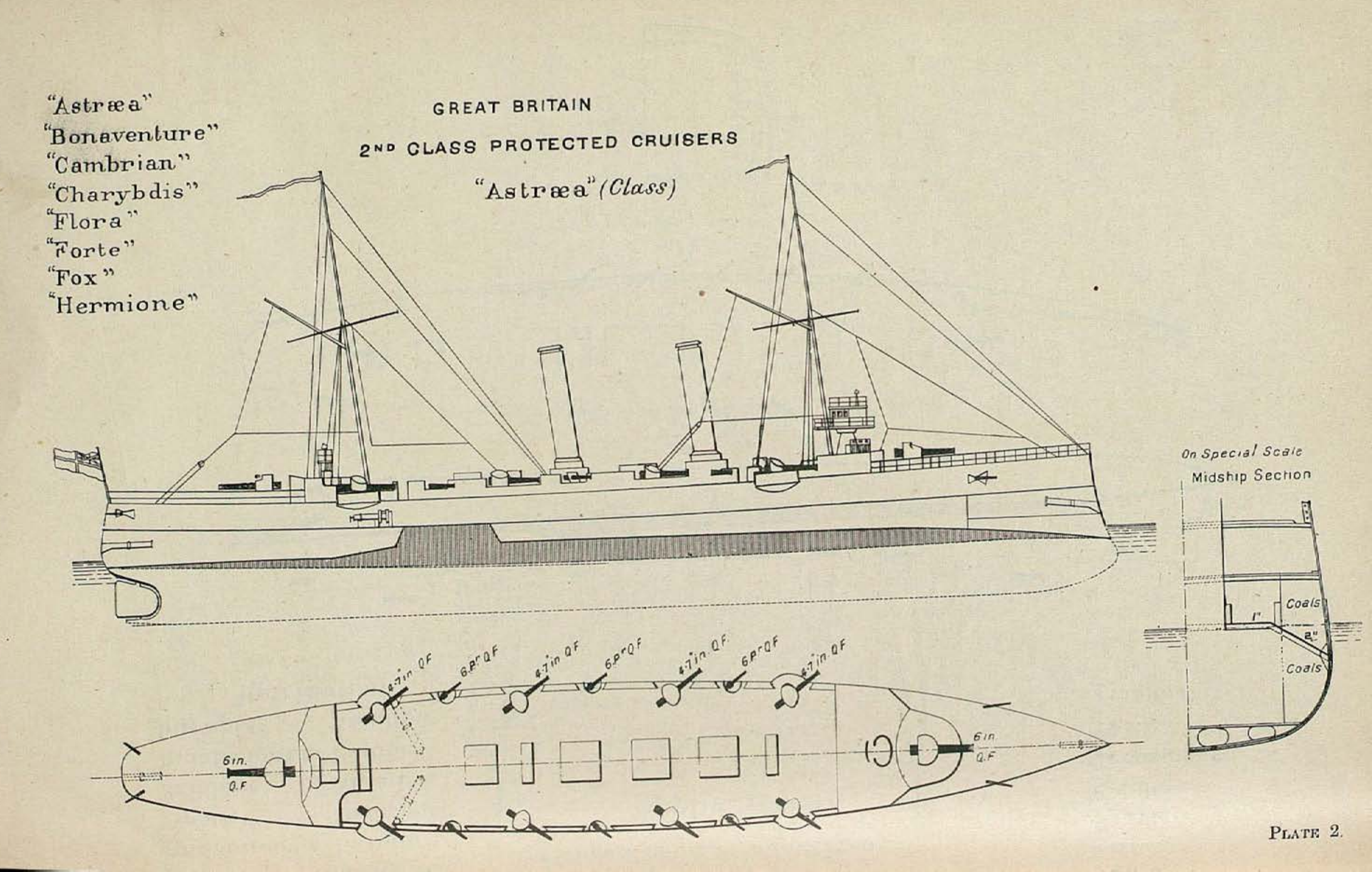

"Astræa"
"Bonaventure"
"Cambrian"
"Charybdis"
"Flora"
"Forte"
"Fox"
"Hermione"
GREAT BRITAIN
2ND CLASS PROTECTED CRUISERS
"Astræa" (Class)
On Special Scale
Midship Section
Coals
1"
2"
Coals
4·7in QF
6Pr QF
4·7in QF
6Pr QF
4·7in QF
6Pr QF
4·7in QF
6in.
Q.F
6in.
Q.F

PLATE 2.

GREAT BRITAIN

"Aurora", "Australia"
"Galatea", "Immortalité", "Narcissus"
"Orlando", "Undaunted"

Midship Section

Coals Armoured Deck

Coals 2" Steel

10"

Section outside Armour Belt

5" 2" 3"

Armoured Deck

Coal

Armoured Deck at top of Belt 2" Steel

10"

L.W.L.

Engines | Engines | Boilers | Boilers

Upper Deck

6" 6" 6" 6" 6"

22 ton B. L. Gun

Conning Tower

22 Ton B L Gun

PLATE 3.

GREAT BRITAIN

"Benbow"

14"
18"
14"
L.W.L.

Spar Deck

6in Q.F.
6in Q.F.
6in Q.F.
6in Q.F.
6in Q.F.

111 ton B.L

111 ton B.L

PLATE 4.

1ST CLASS PROTECTED CRUISERS

"Blake" & "Blenheim"

5-3

6" Q.F.

6" Q.F.

6" Q.F.

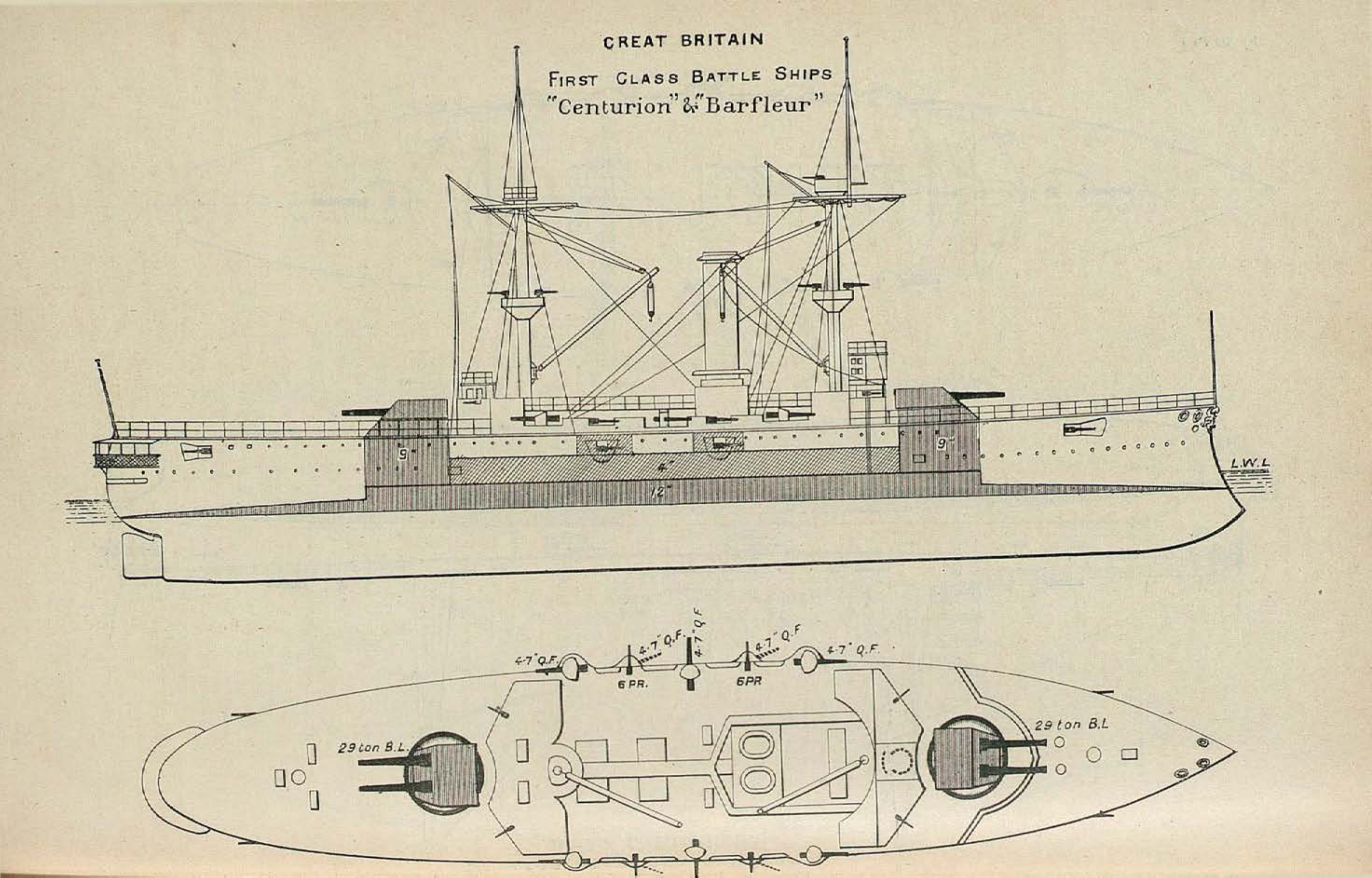
6" Q.F.

6" Q.F.

22 ton B.L.

22 ton B.L.

PLATE 5.


GREAT BRITAIN
FIRST CLASS BATTLE SHIPS
"Centurion" & "Barfleur"
L.W.L
9"
5"
4"
12"
4·7" Q.F.
4·7" Q.F.
4·7" Q.F
4·7" Q.F
4·7" Q.F.
6 PR.
6PR
29 ton B.L.
29 ton B.L

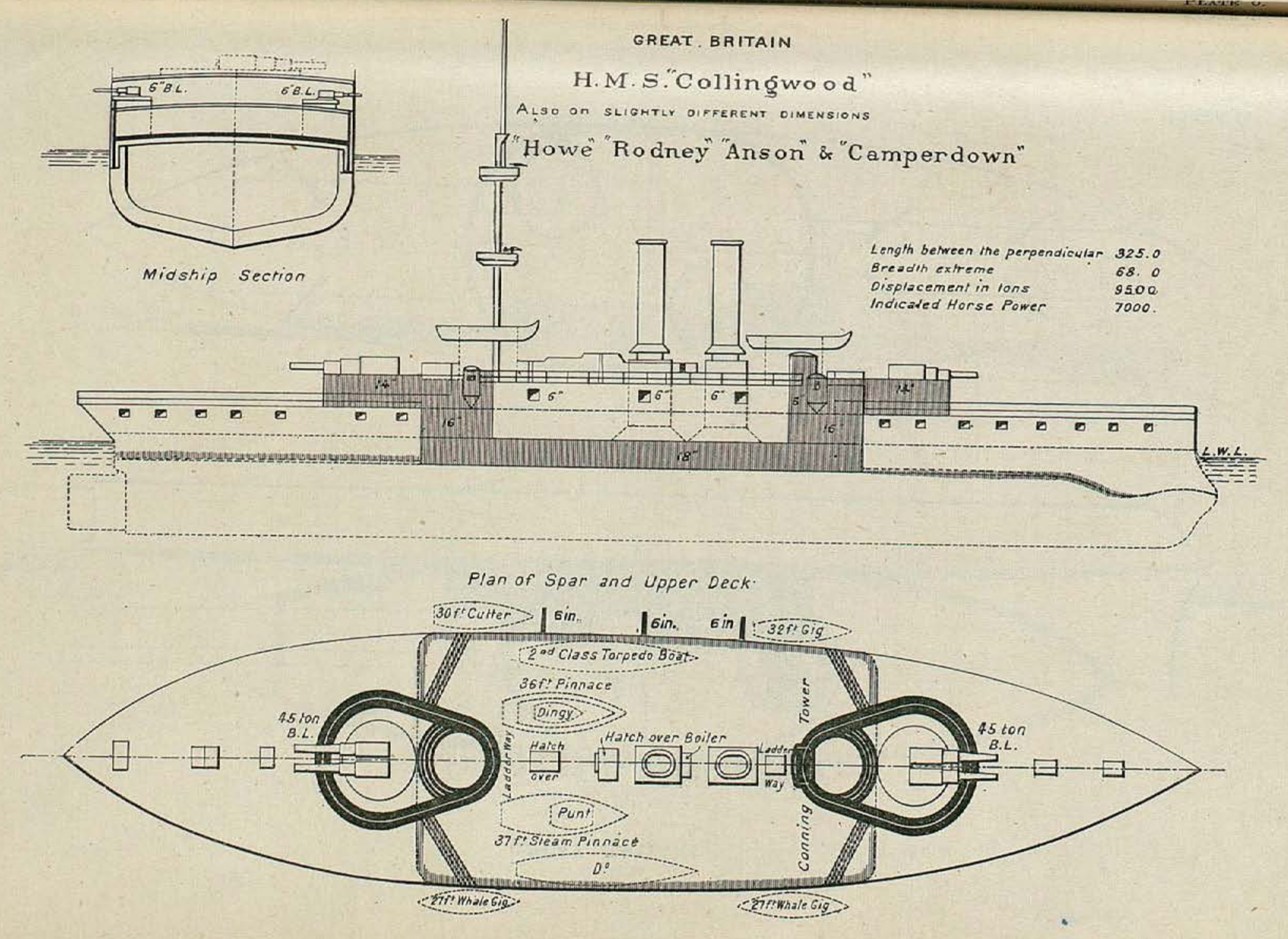

GREAT. BRITAIN
H.M.S. "Collingwood"
Also on slightly different dimensions
"Howe" "Rodney" "Anson" & "Camperdown"
Length between the perpendicular 325.0
Breadth extreme 68. 0
Displacement in tons 9500
Indicated Horse Power 7000.
6" B.L.
6" B.L.
Midship Section
14"
16"
6"
18"
L.W.L.
Plan of Spar and Upper Deck
30 ft Cutter
6in.
6in.
6in
32 ft Gig
2nd Class Torpedo Boat
36 ft Pinnace
Dingy
45 ton B.L.
Ladder Way
Hatch over
Hatch over Boiler
Ladder Way
Conning Tower
Punt
37 ft Steam Pinnace
D°
27 ft Whale Gig
27 ft Whale Gig

PLATE 7.

GREAT BRITAIN

"Colossus" & "Edinburgh"

Plate 8.

GREAT BRITAIN

"Conqueror" & "Hero"

12"

12"–8½"

Upper Deck

6" B.L.

6" B.L.

01½"

43 ton B.L.

PLATE 9.

GREAT BRITAIN.

"Diadem"
1st class. Cruisers

Ships of "Diadem" class
"Andromeda"
"Diadem"
"Europa"
"Niobe"

On Special Scale.

12 Pr Q.F.
6" Q.F.
12 Pr Q.F.
12 Pr Q.F.
12 Pr Q.F.
12 Pr Q.F.
6" Q.F.
12 Pr Q.F.
6" Q.F.
6" Q.F
6" Q F
6" Q F
6" Q F.
6" Q F.
6" Q F.
6" Q F.

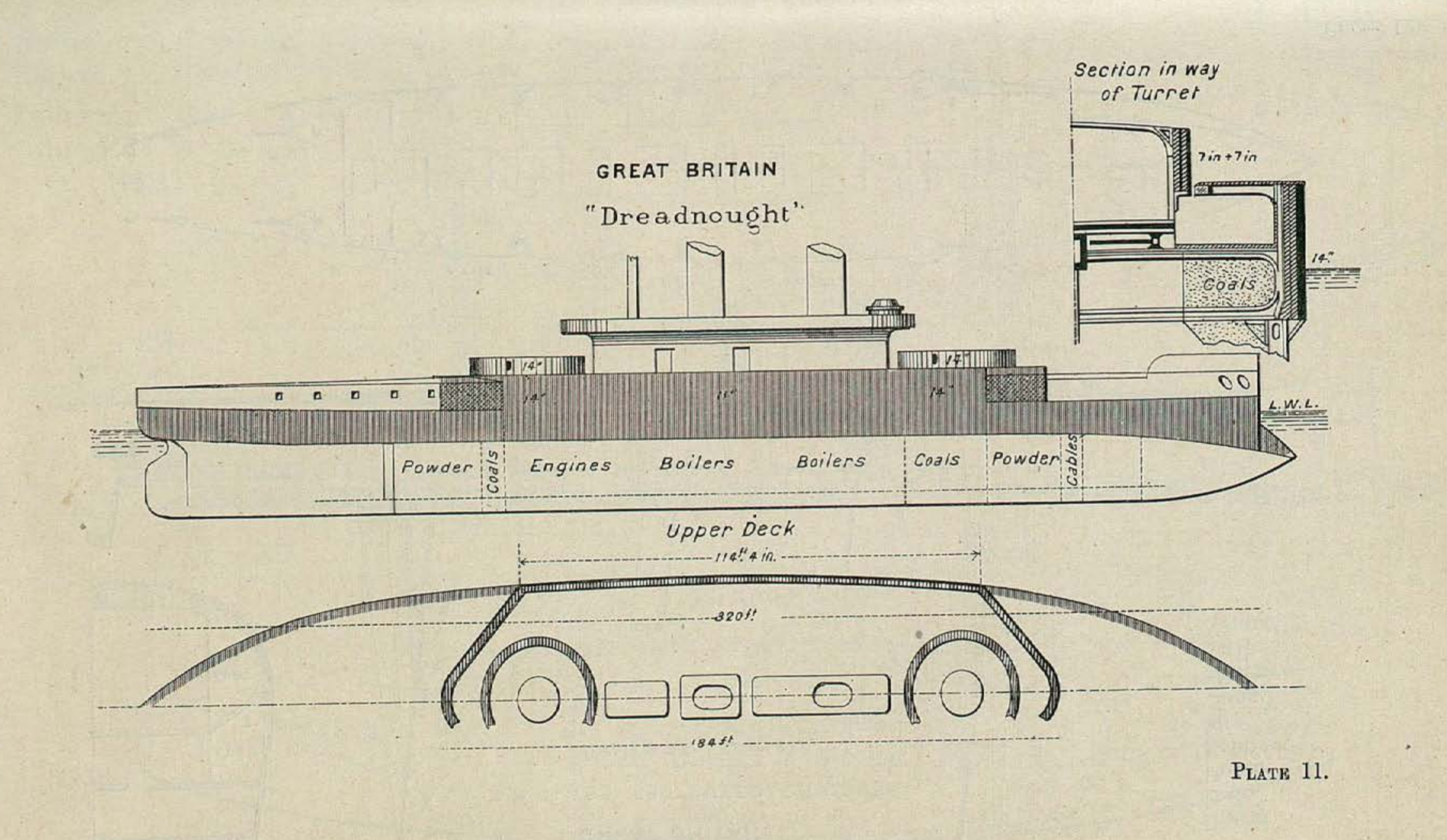

GREAT BRITAIN
"Dreadnought"
Section in way of Turret
7in + 7in
14"
Coals
L.W.L.
14"
14"
Powder
Coals
Engines
Boilers
Boilers
Coals
Powder
Cables
Upper Deck
114 ft. 4 in.
320 ft
184 ft

Plate 11.

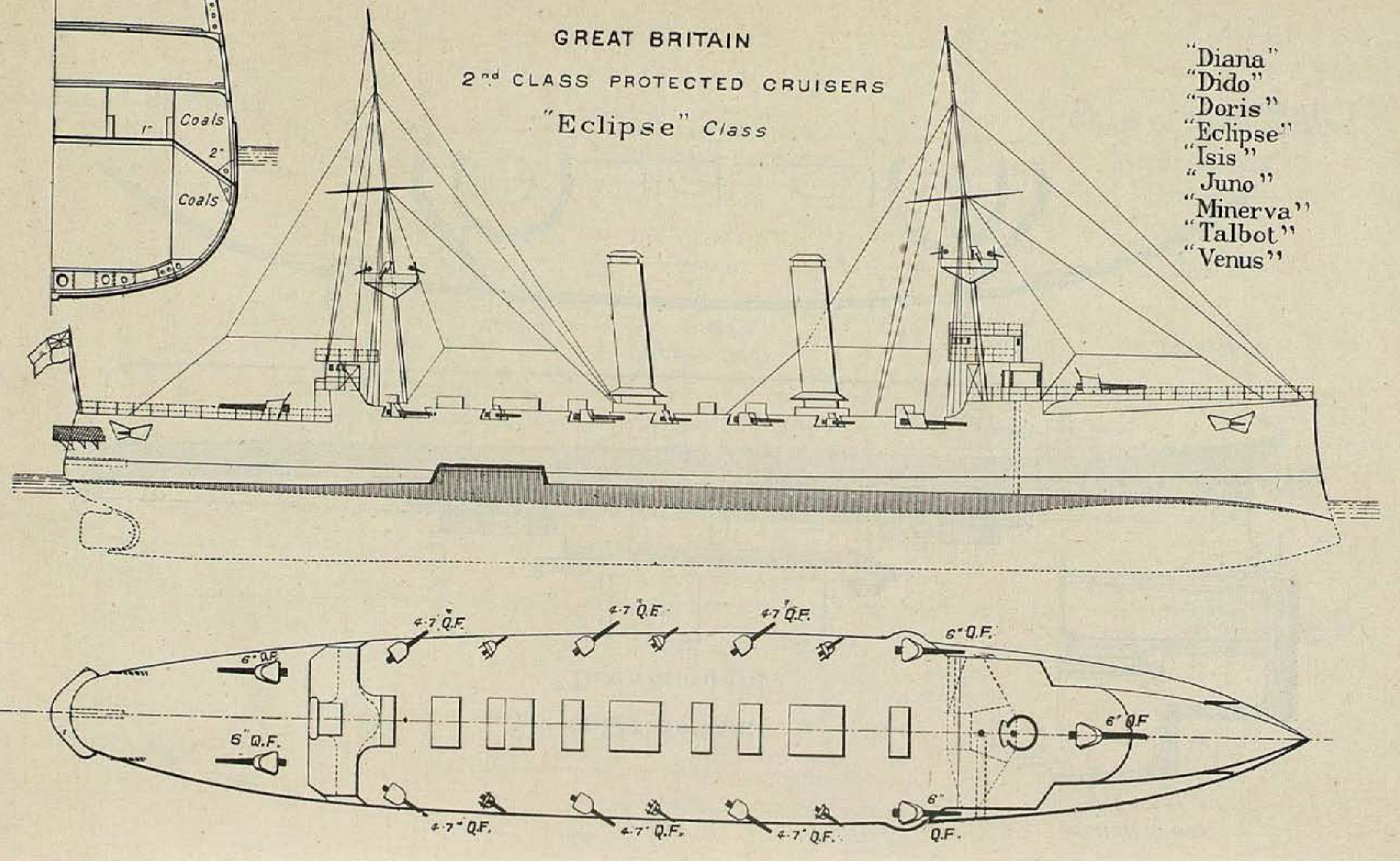

GREAT BRITAIN
2nd CLASS PROTECTED CRUISERS
"Eclipse" Class
"Diana"
"Dido"
"Doris"
"Eclipse"
"Isis"
"Juno"
"Minerva"
"Talbot"
"Venus"
Coals
1"
2"
Coals
4·7" Q.F.
4·7" Q.F.
4·7" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
4·7" Q.F.
4·7" Q.F.
4·7" Q.F.
6" Q.F.

PLATE 12.

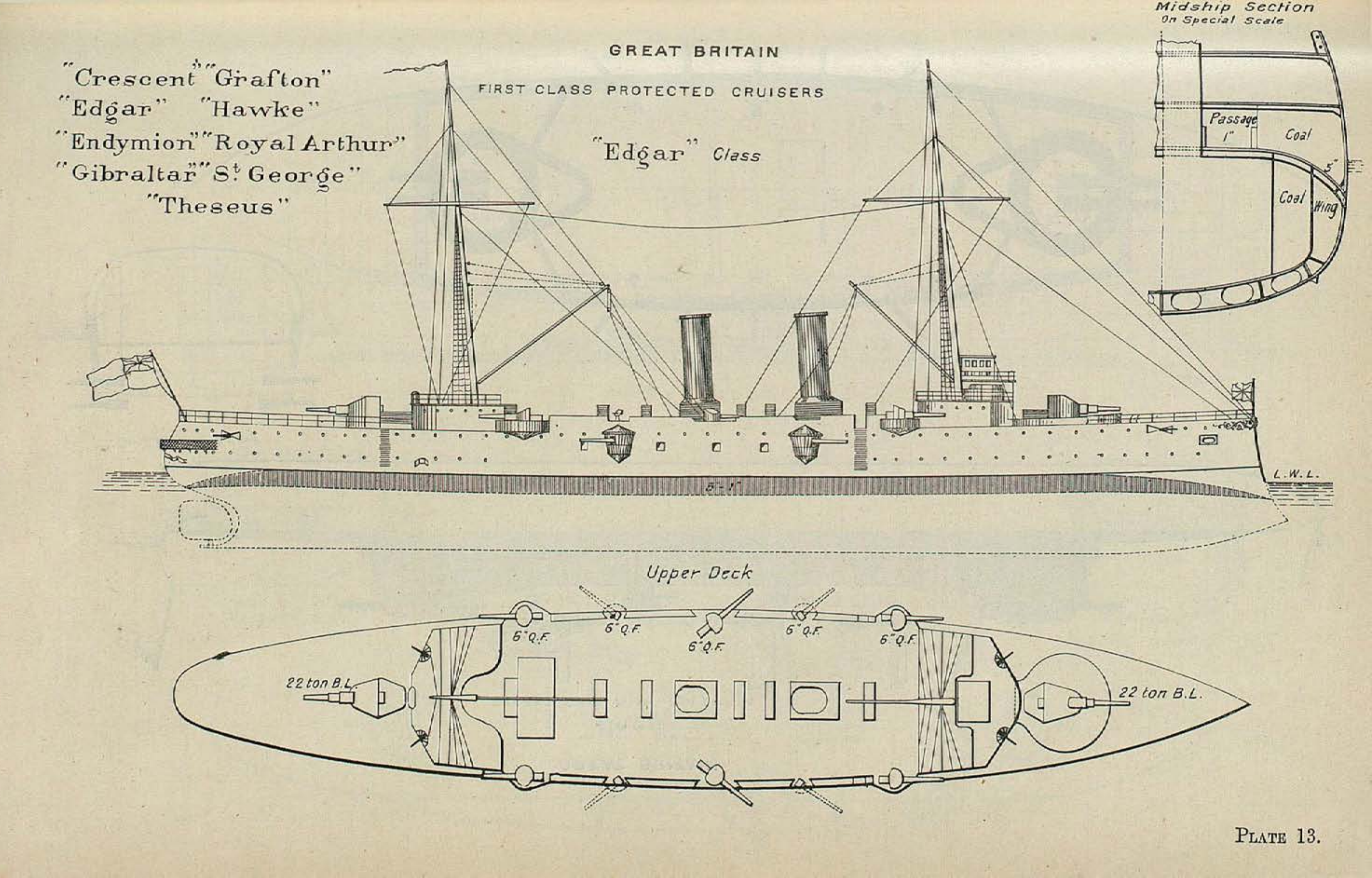

GREAT BRITAIN
FIRST CLASS PROTECTED CRUISERS
"Edgar" Class
"Crescent" "Grafton"
"Edgar" "Hawke"
"Endymion" "Royal Arthur"
"Gibraltar" "St George"
"Theseus"
Midship Section
On Special Scale
Passage
1"
Coal
Coal
Wing
5"
L.W.L.
5'-1"
Upper Deck
22 ton B.L.
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
22 ton B.L.

PLATE 13.

GREAT BRITAIN

"Hood"

TURRET SHIP WITH REDOUBTS

PLATE 14.

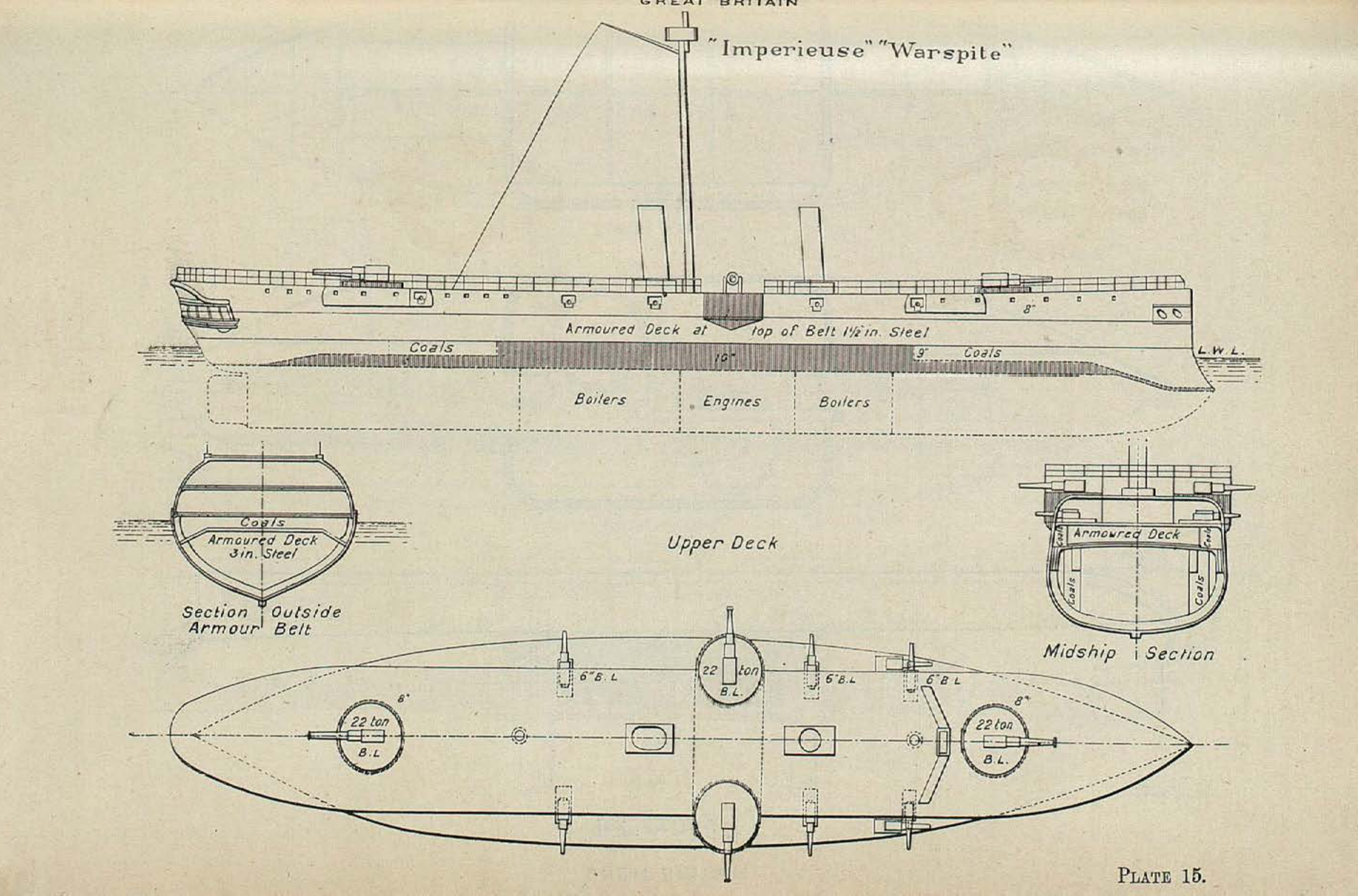

"Imperieuse" "Warspite"
8"
Armoured Deck at top of Belt 1½ in. Steel
Coals
10"
9"
Coals
L.W.L.
Boilers
Engines
Boilers
Coals
Armoured Deck
3 in. Steel
Section Outside
Armour Belt
Upper Deck
Armoured Deck
Coals
Coals
Midship Section
22 ton
B.L.
8"
6" B.L
22 ton
B.L.
6" B.L
6" B.L
8"
22 ton
B.L.

PLATE 15.

GREAT BRITAIN

"Inflexible"

20 in.
24 in.
8 in.
L.W.L.
320 feet

Upper Deck

2. 80 ton M.L.R.
2 80 ton M.L.R.
30 ft.
21 ft. 6"

Lower Deck

Cork
Coals
Cork
Coals
Coals
Cables
Coals

GREAT BRITAIN

AUSTRALIAN CRUISERS

"Katoomba" Class

"Katoomba" Class: "Katoomba", "Mildura", "Ringarooma", "Tauranga", "Wallaroo"

"Pearl" Class: "Pallas", "Pearl", "Philomel", "Phæbe"

3. P. Q.F.
4·7" Q.F.
4·7" Q.F.
3 P. Q.F.
4·7" Q.F.
4·7" Q.F.

On Special Scale

1"
2"

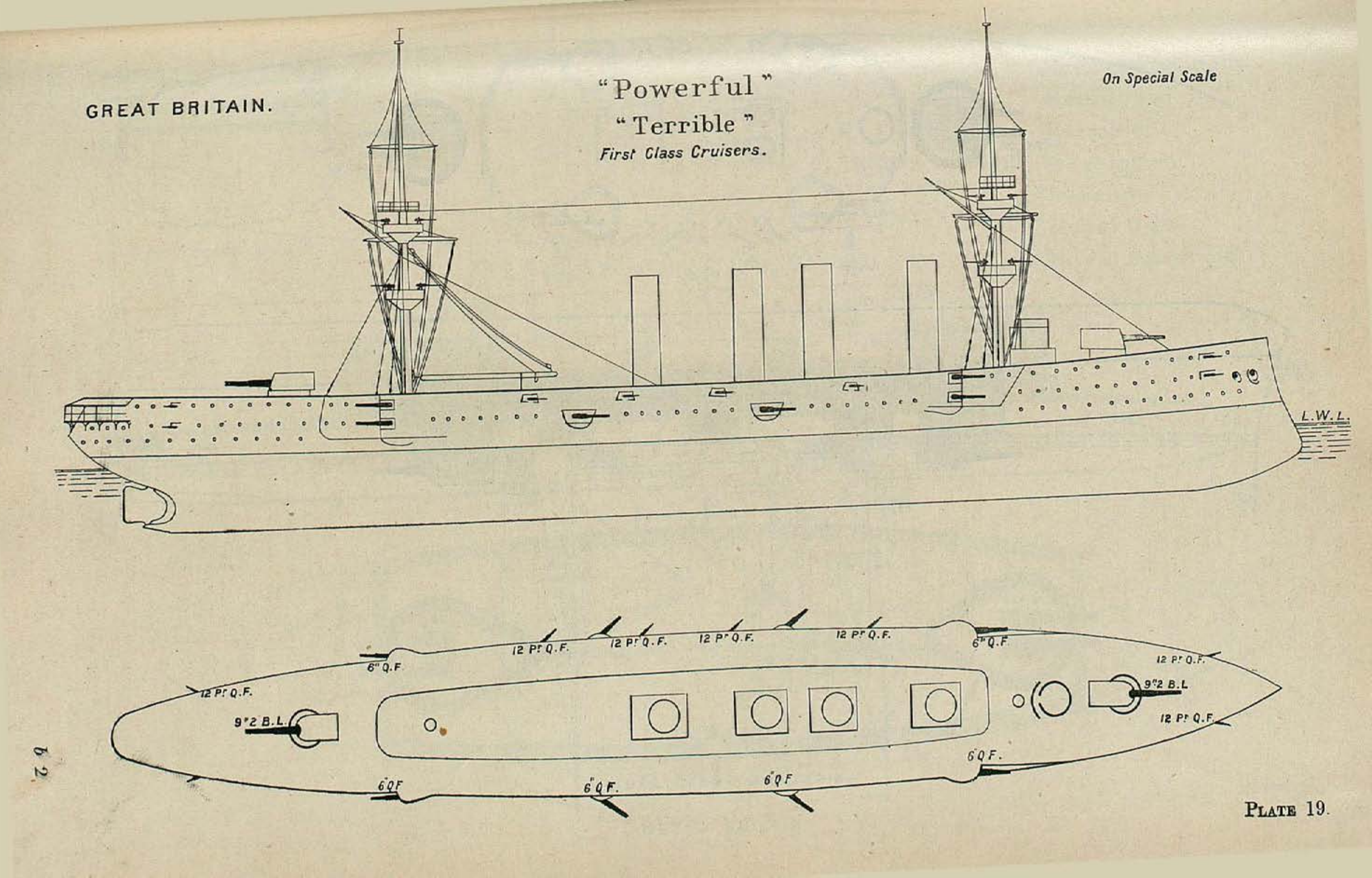
PLATE 17.

GREAT BRITAIN

"Majestic"

"Majestic" Class

"Majestic" "Victorious"
"Magnificent" "Mars"
"Hannibal" "Illustrious"
"Prince George" "Cœsar"
"Jupiter"


GREAT BRITAIN.
"Powerful"
"Terrible"
First Class Cruisers.
On Special Scale
L.W.L.
12 Pr Q.F.
9"2 B.L.
6" Q.F.
12 Pr Q.F.
12 Pr Q.F.
12 Pr Q.F.
12 Pr Q.F.
6" Q.F.
12 Pr Q.F.
9"2 B.L.
12 Pr Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
PLATE 19.

GREAT BRITAIN

FIRST CLASS BATTLESHIP

"Renown"

10"

6"

8"

10"

L.W.L.

6" Q.F

12 Pr Q.F.

12 Pr Q.F.

6" Q.F.

12 Pr Q.F.

12 Pr Q.F.

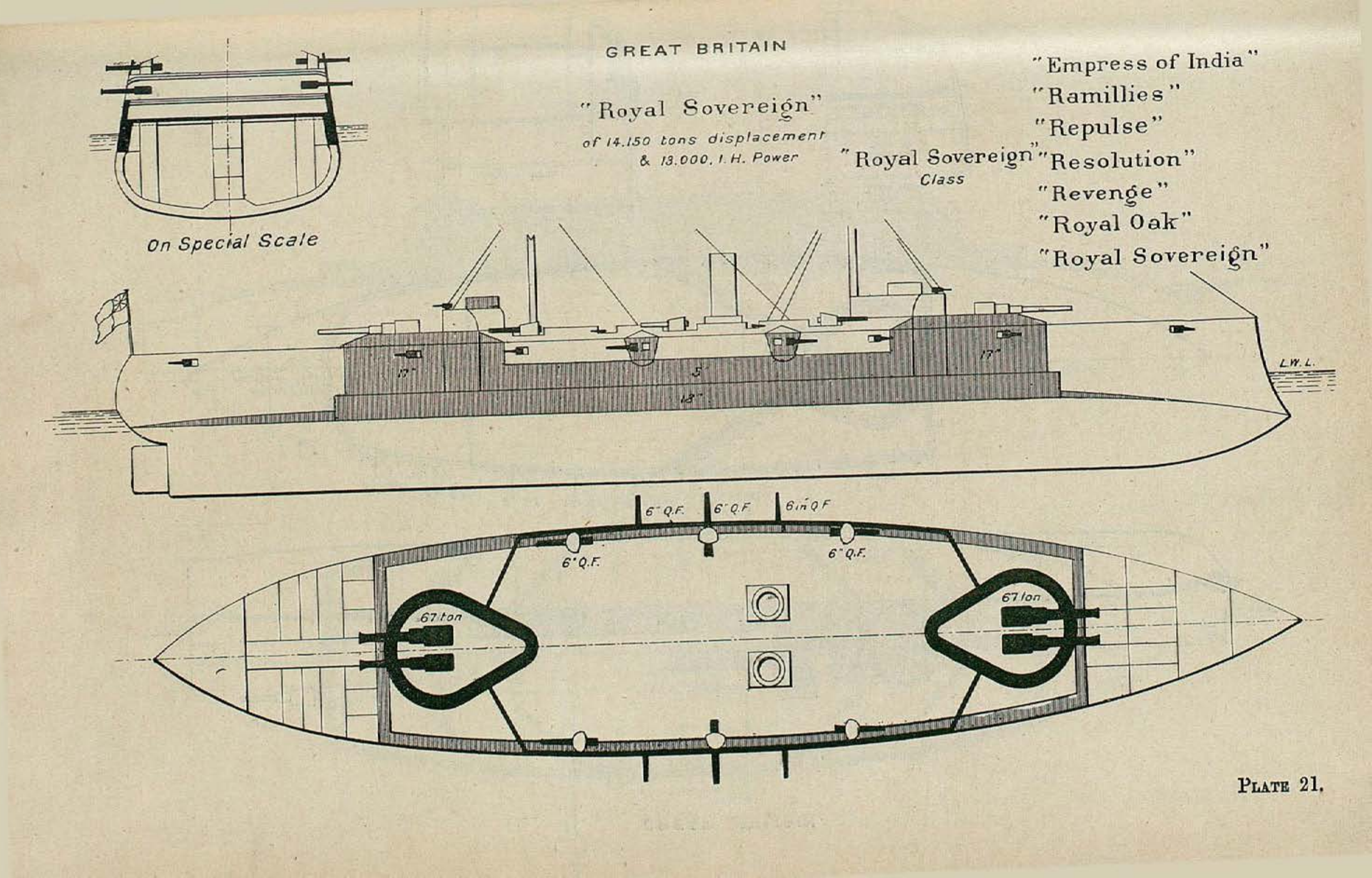
6" Q.F.

6" Q.F.

6" Q.F

10" 29 ton

10" 29 ton


GREAT BRITAIN
"Royal Sovereign"
of 14.150 tons displacement & 13.000. I.H. Power
"Royal Sovereign" Class
"Empress of India"
"Ramillies"
"Repulse"
"Resolution"
"Revenge"
"Royal Oak"
"Royal Sovereign"
On Special Scale
L.W.L.
17"
5"
18"
17"
6" Q.F.
6" Q.F.
6 in Q.F.
6" Q.F.
6" Q.F.
67 ton
67 ton
PLATE 21.

GREAT BRITAIN.

"Sans Pareil"

18"
6"
18"
18–16
L.W.L

6 in Q.F.
6 in Q.F.
6 in Q.F.
6 in Q.F.
6 in Q.F.
150'
16 in
111 ton
29 ton
150'

Span Deck
Upper Deck
Machinery Space
Coals

Upper Deck
Crew Space
Main Deck
Coals
Armour Deck 3"
Coals
W.T. Compt

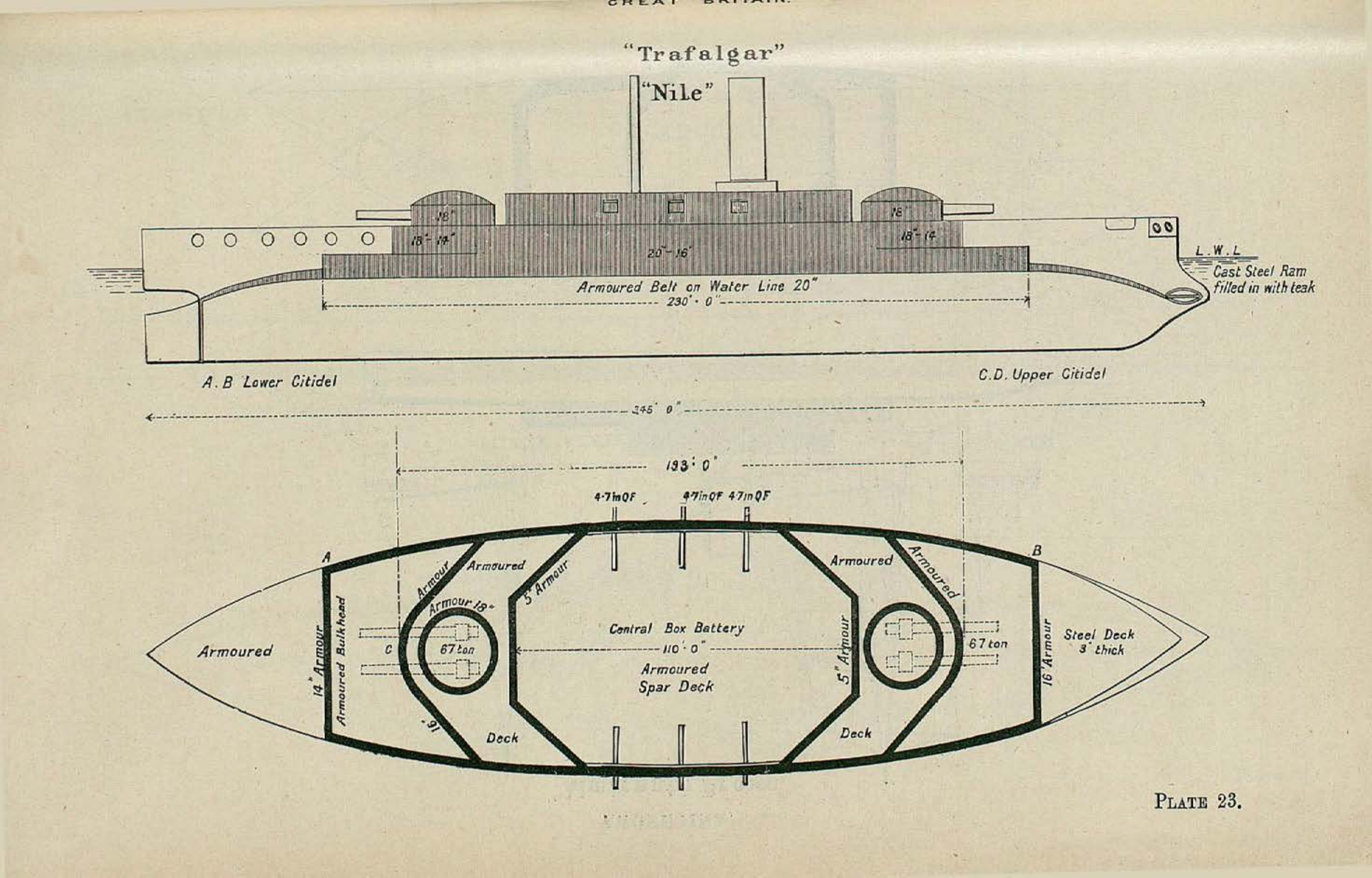
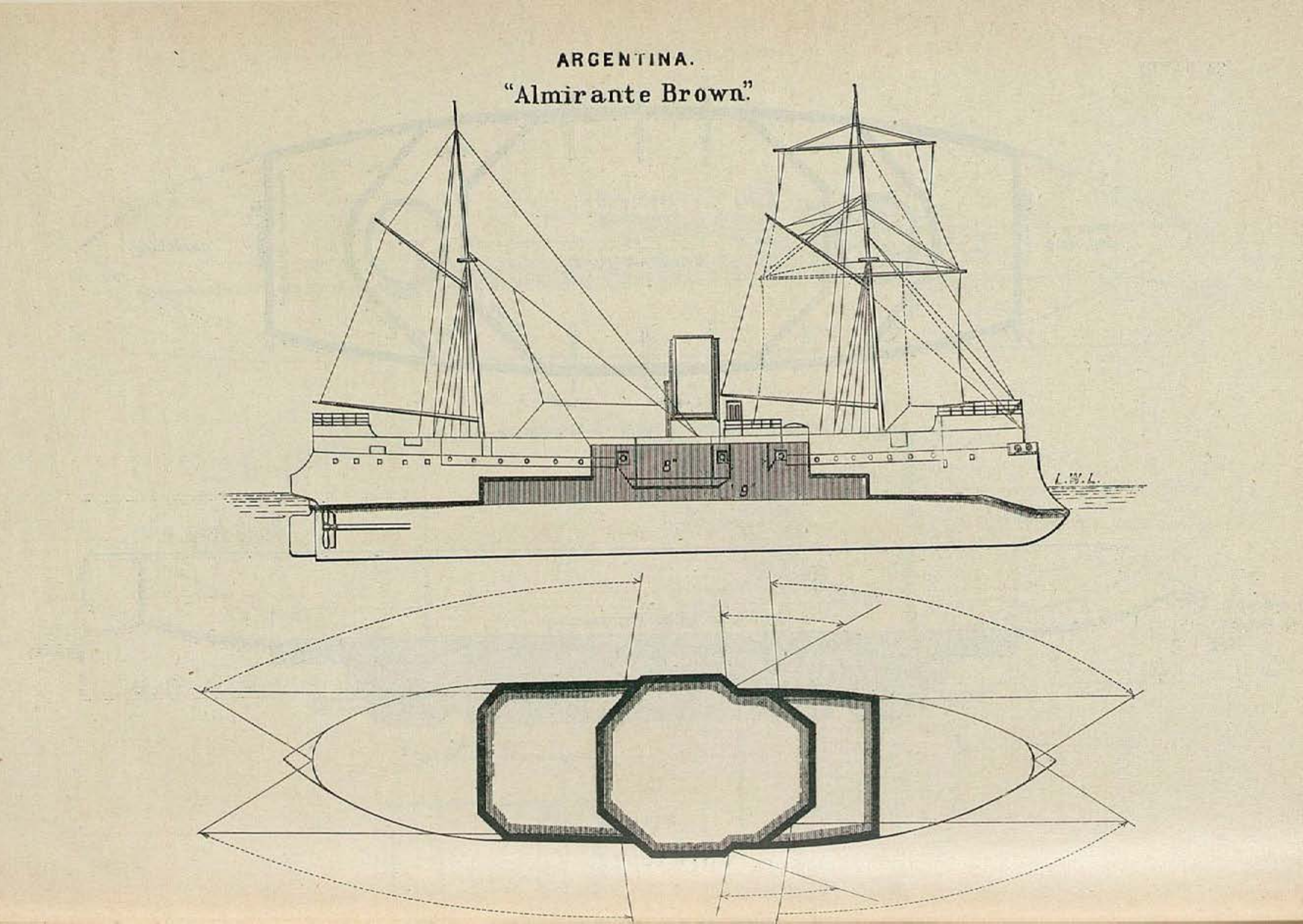

"Trafalgar"
"Nile"
18"
18"-14"
20"-16"
18"
18"-14
L.W.L
Cast Steel Ram filled in with teak
Armoured Belt on Water Line 20"
230'·0"
A.B Lower Citidel
C.D. Upper Citidel
345' 0"
193' 0"
4·7inQF
4·7inQF 4·7inQF
A
B
C
Armoured
14" Armour
Armoured Bulkhead
Armour
Armoured
Armour 18"
67 ton
16"
Deck
5" Armour
Central Box Battery
110'·0"
Armoured Spar Deck
Armoured
Armoured
5" Armour
67 ton
Deck
16" Armour
Steel Deck 3" thick

PLATE 23.


ARGENTINA.
"Almirante Brown."
8"
9"
L.W.L.

ARGENTINA

PROTECTED CRUISER

"Buenos Aires."

L.W.L.

3"–1½"

8"

6" Q.F.

4·7" Q.F.

4·7" Q.F.

4·7" Q.F.

6" Q.F.

8"

6" Q.F.

4·7" Q.F.

4·7" Q.F.

4·7" Q.F.

6" Q.F.

PLATE 25.

ARGENTINA.

"Libertad" & "Independencia."

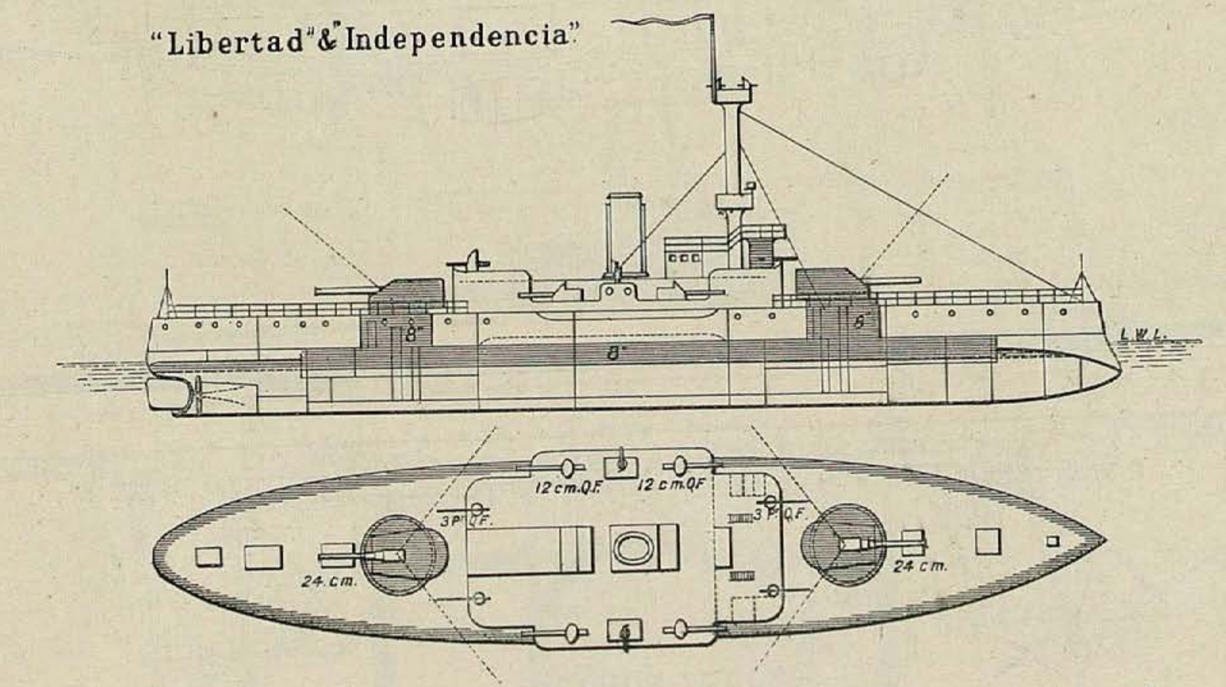


PLATE 26.

"Nueve de Julio."

Plate 27.

AUSTRIA HUNGARY.

"Kaiser Franz Joseph".

"Kaiserin Elizabeth"

3½"

3½"

3½" – 2"

L.W.L.

15 c.m.

24 c.m. 27 Ton.

24 c.m. 27 Ton.

15 c.m.

15 c.m.

AUSTRIA-HUNGARY.

"Kaiserin Maria Teresa"

4"

4"

4"

4"

4"

4"

L.W.L.

15 c.m. Q.F.

15 c.m. Q.F.

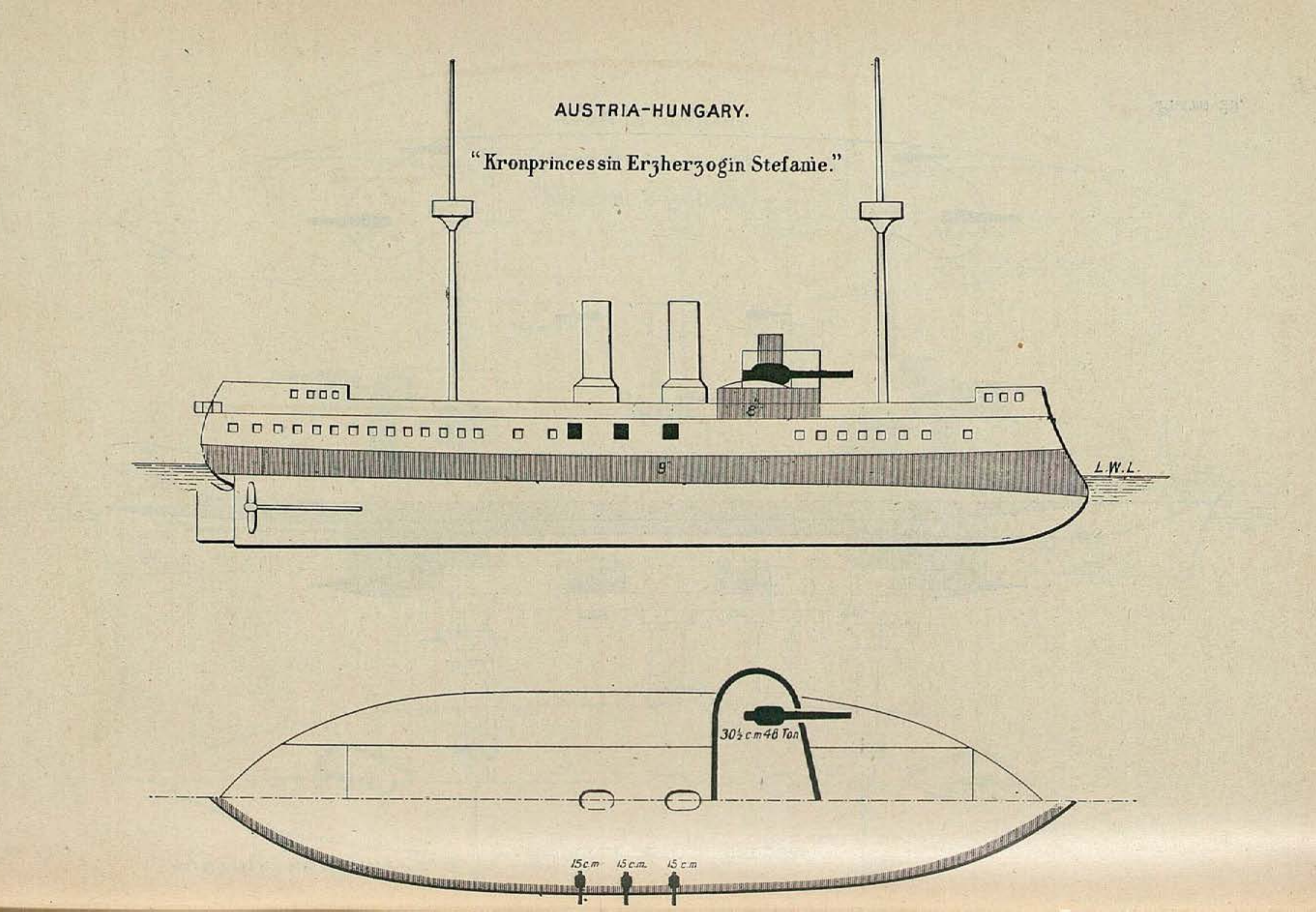
24 c.m.

24 c.m.

15 c.m. Q.F.

15 c.m. Q.F.

PLATE 29.


AUSTRIA-HUNGARY.
"Kronprincessin Erzherzogin Stefanie."
L.W.L.
8"
9"
30½ c.m 48 Ton
15 c.m
15 c.m.
15 c.m

AUSTRIA HUNGARY.

"Kronprinz Erzherzog Rudolph"

L.W.L.

10"

12"

12 in 48 Ton

12 c.m.

12 c.m.

12 c.m.

12 in 48 Ton

Plate 31.

AUSTRIA-HUNGARY.

"Budapest"
"Monarch"
"Wien"

L.W.L.

8" 10½" 3½" 3½" 10½"

24 c.m. 15 c.m. 47 m/m

BRAZIL.

"Riachuelo"

L.W.L.

Tiller Room

Steering Engine

Small Arms Mag.^s

Engine Room

11"

Shell Room

Magazine

Stores

11"

Plan of Upper Deck

9" B.L

9" B.L

4·7in Q F

4·7in Q F

4·7in Q F

4·7in Q F

4·7in Q F

4·7in Q F

PLATE 33.

CHILI.

"Blanco Encalada"

L.W.L.

4-1¾"

8" B.L

6" Q.F

6" Q.F

6" Q.F

6" Q.F

6" Q.F

8" B.L

PLATE 34.

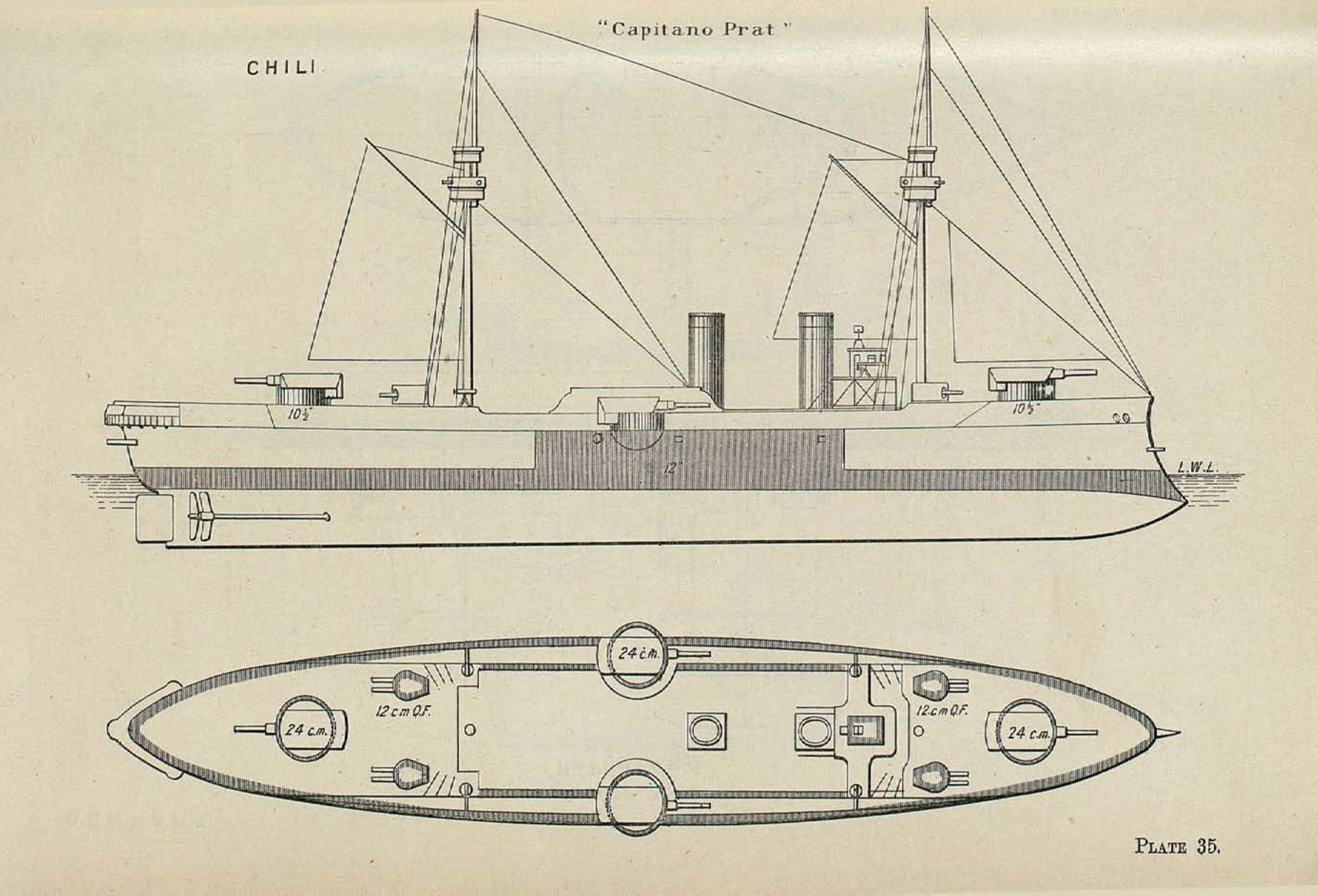

"Capitano Prat"
CHILI
10½"
10½"
12"
L.W.L.
24 c.m.
24 c.m.
24 c.m.
12 c m Q.F.
12 c m Q.F.

PLATE 35.

DENMARK.

"Helgoland"

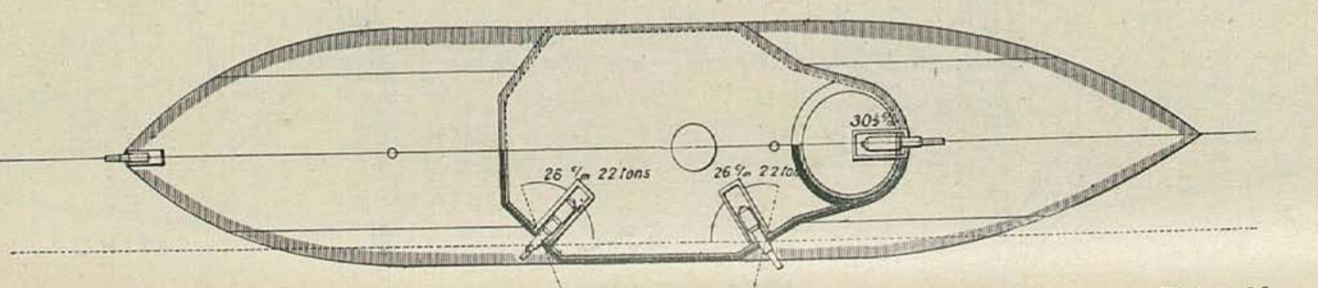
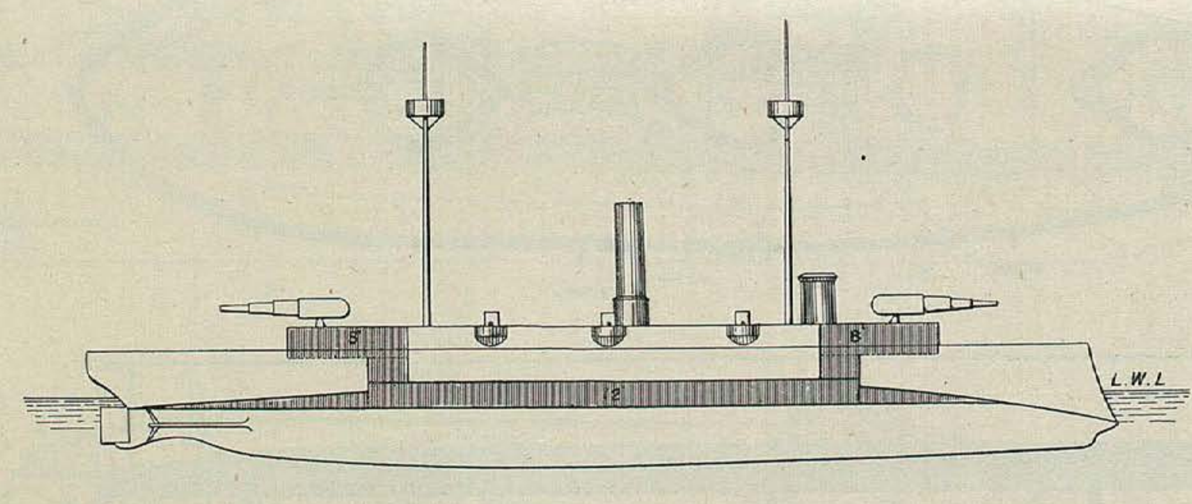
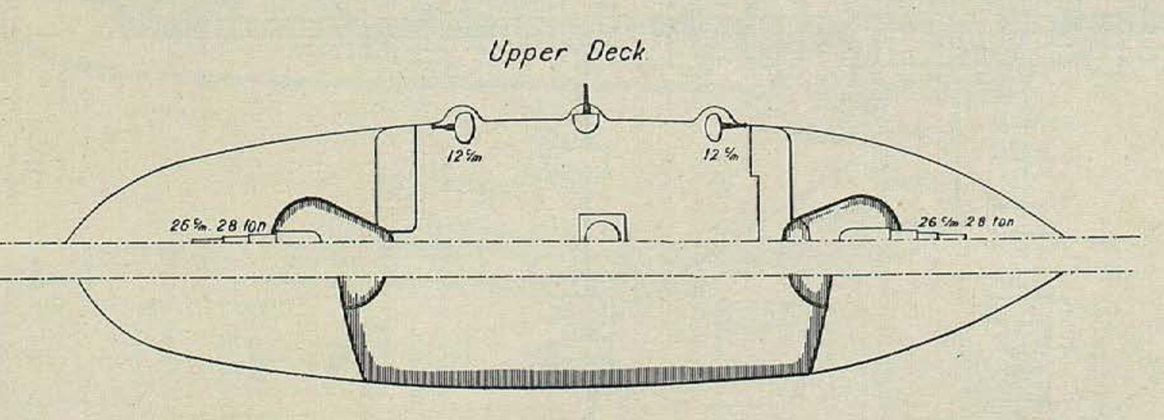


PLATE 36.

"Iver Hvitfeld"

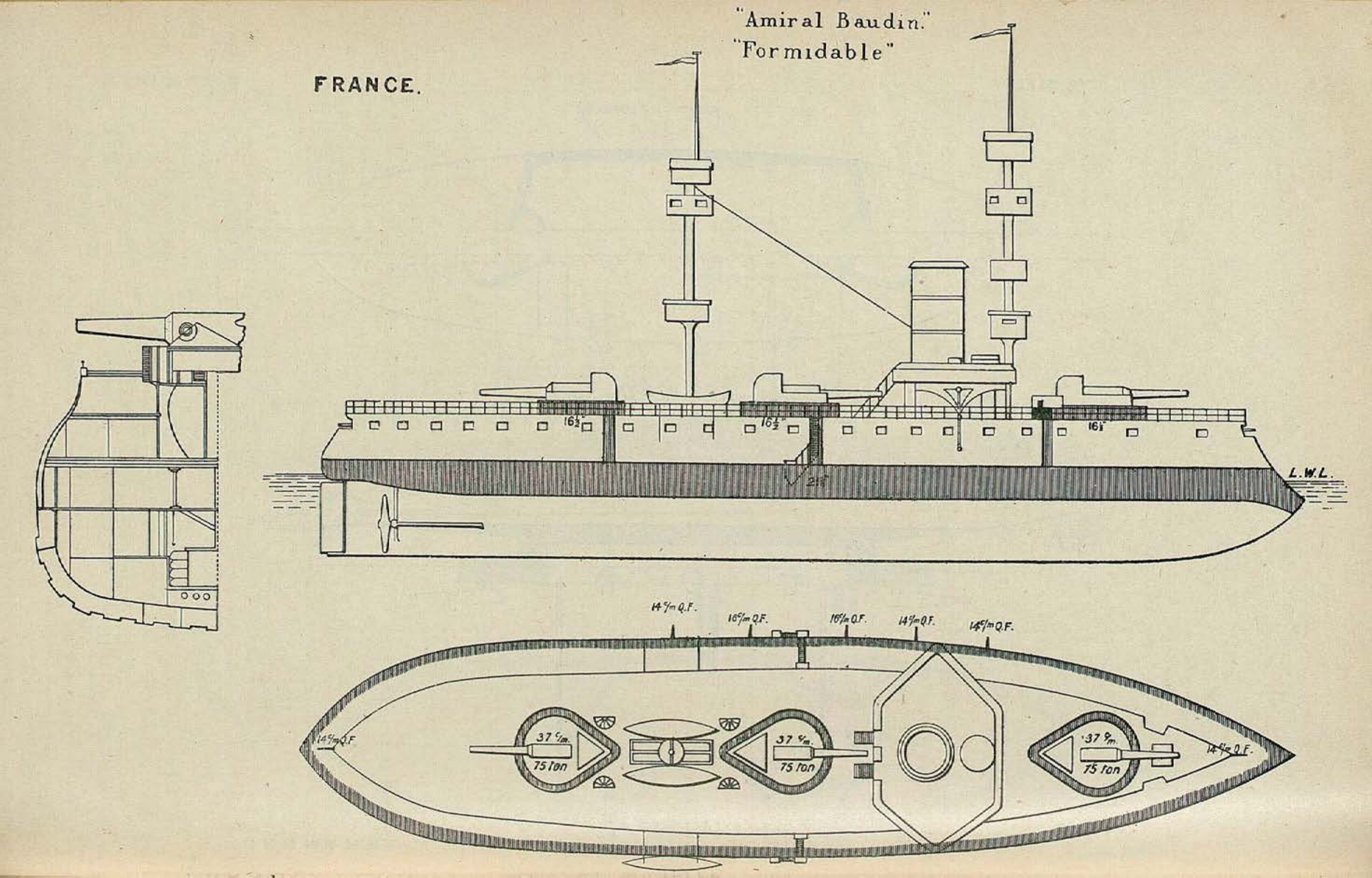


Upper Deck



Armoured Deck

PLATE 37.


FRANCE.
"Amiral Baudin."
"Formidable"
16½"
16½"
16"
21"
L.W.L.
14 c/m Q.F.
16 c/m Q.F.
16 c/m Q.F.
14 c/m Q.F.
14 c/m Q.F.
14 c/m Q.F.
37 c/m.
75 ton
37 c/m.
75 ton
37 c/m.
75 ton
14 c/m Q.F.

FRANCE. "Amiral Duperré"

Upper Deck.

Main Deck.

PLATE 39.

FRANCE.

(a) "Bouvines"
"Jémmapes"
(a) "Trehouart"
"Valmy"

14½"
12½"
14½"
12½"
17¾"–10"
L.W.L.

Upper Deck

(a) the upper decks of these ships have been raised forward to make them more seaworthy The other two are as sketch.

10 c/m. Q.F.
10 c/m. Q.F.
34 c/m. B.L.
34 c/m. B.L.

Armour Deck.

FRANCE.

"Brennus"
Battle Ship.

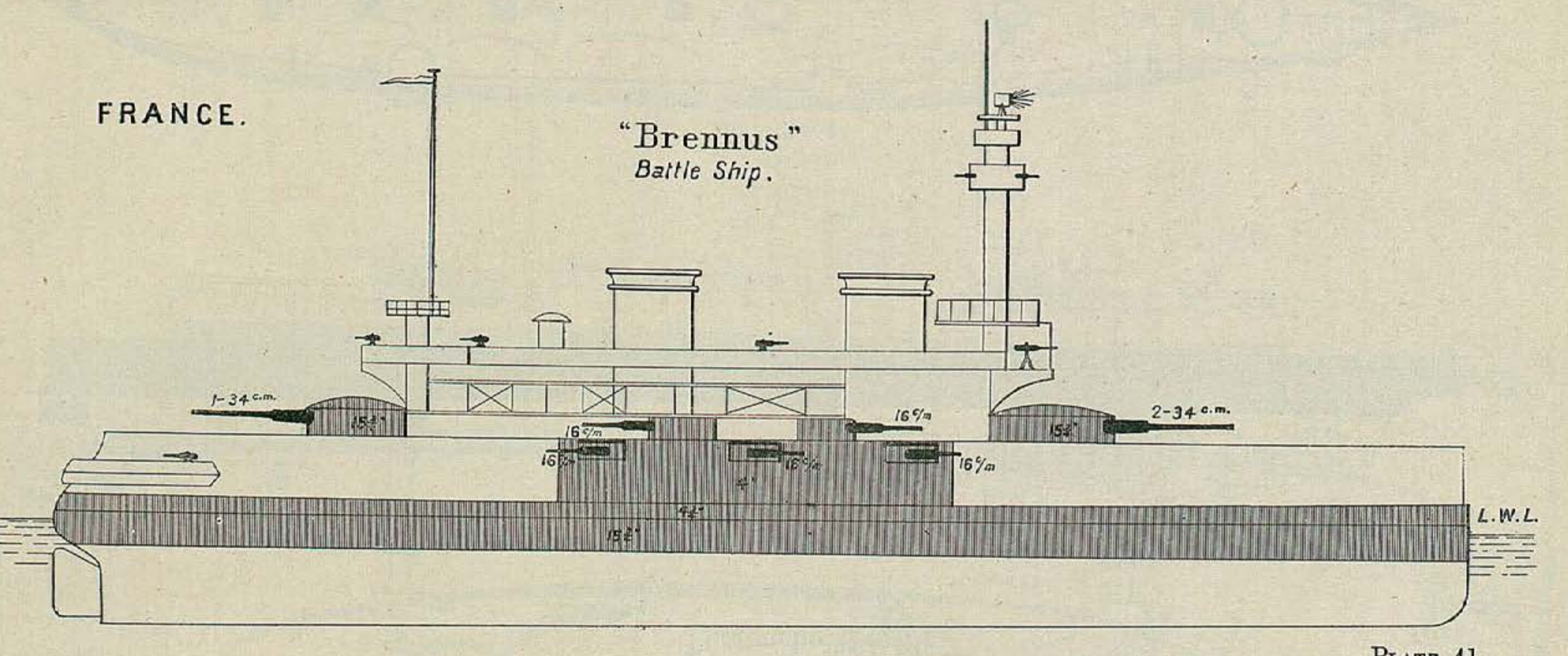


PLATE 41.

FRANCE.

"Bruix" class { "Bruix", "Chanzy", "Charner", "Latouche Tréville"

L.W.L.

3½"

Spar Deck

14 c/m Q.F.

14 c/m Q.F.

14 c/m Q.F.

19 c/m B.L.

19 c/m B.L.

PLATE 42.

"Caiman"
"Indomptable"
"Requin"
"Terrible"

L.W.L.

42 c/m B.L.

17"

10 c/m Q.F.

10 c/m Q.F.

42 c/m B.L.

PLATE 43.

FRANCE.

"Carnot"

4"

17¾" – 10'

L.W.L.

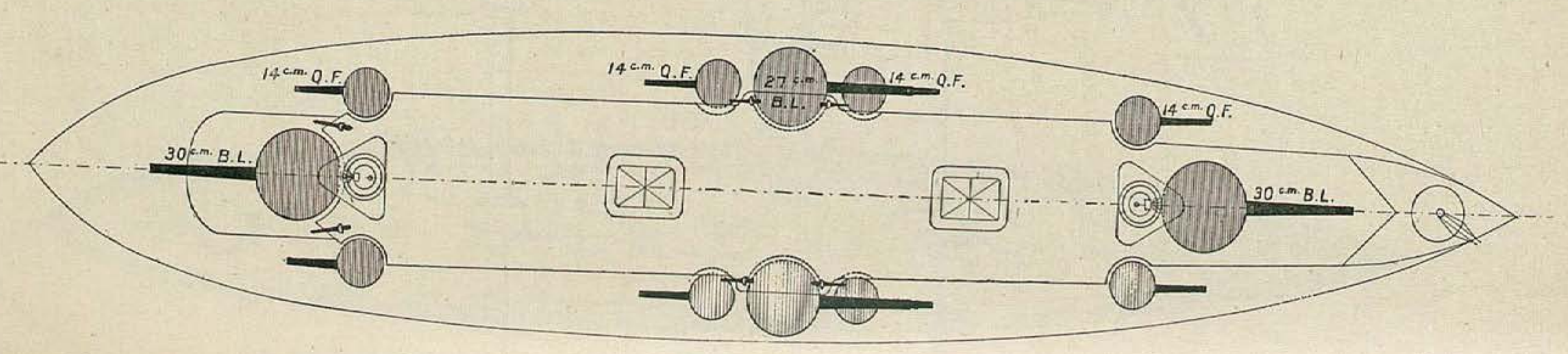


PLATE 44.

FRANCE

"Charlemagne"
"St Louis"
"Gaulois"

Plate 45.

FRANCE

"Chasseloup Laubat."
"Bugeaud."
"Friant."

L. W. L.

4" – 2¼"

16 c.m Q. F.

16 c.m Q. F.

16 c.m Q. F.

16 c.m Q. F.

10 c.m Q. F.

10 c.m Q. F.

PLATE 46.

"Devastation"
"Redoutable"

PL. 43

$9\frac{1}{2}''$

$14\frac{3}{4}''$

L.W.L

Upper Deck

Main Deck

34 c/m B.L

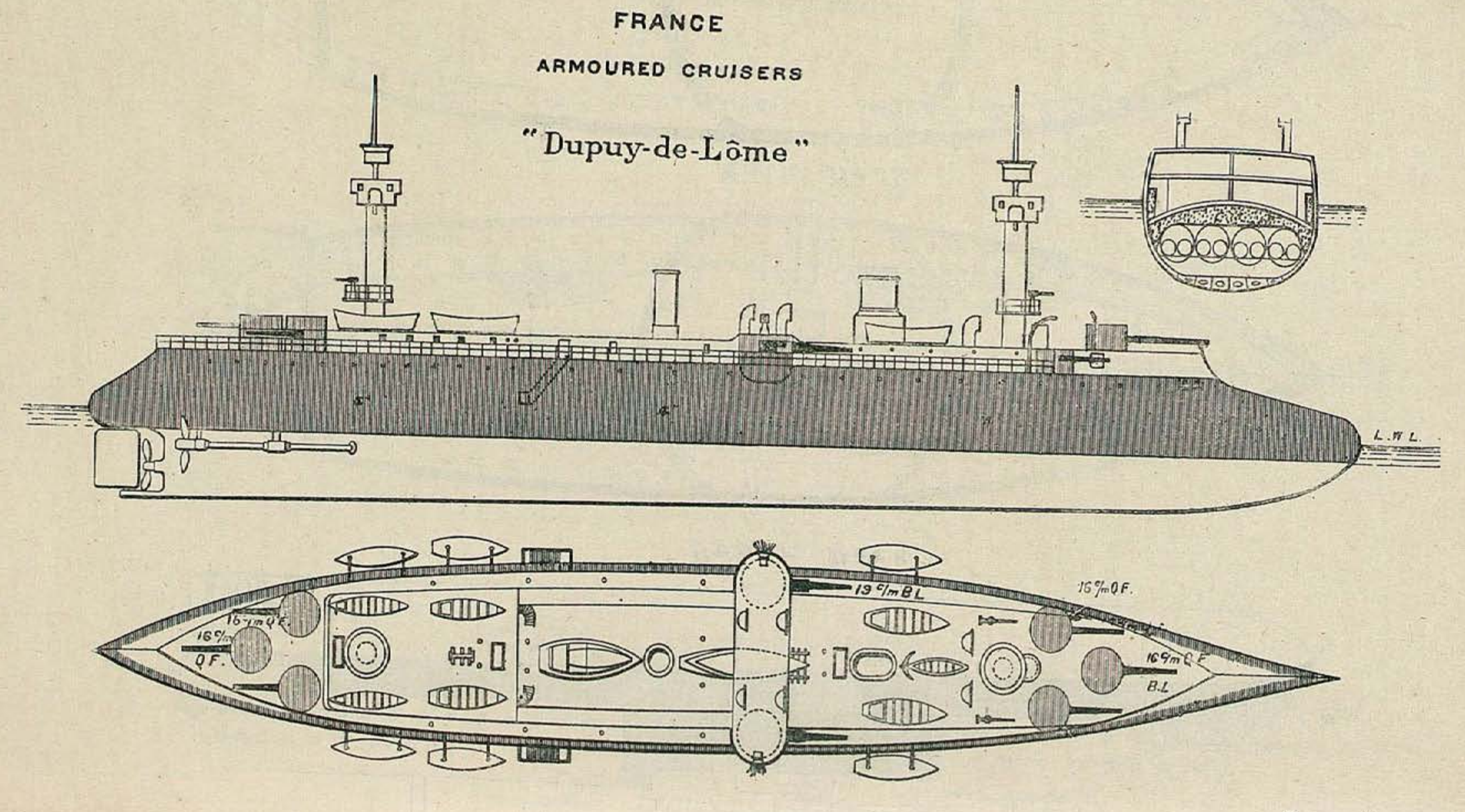
$34\frac{c/m}{2}$ B.L.

PLATE 47.

FRANCE

ARMOURED CRUISERS

"Dupuy-de-Lôme"



FRANCE

"Hoche"

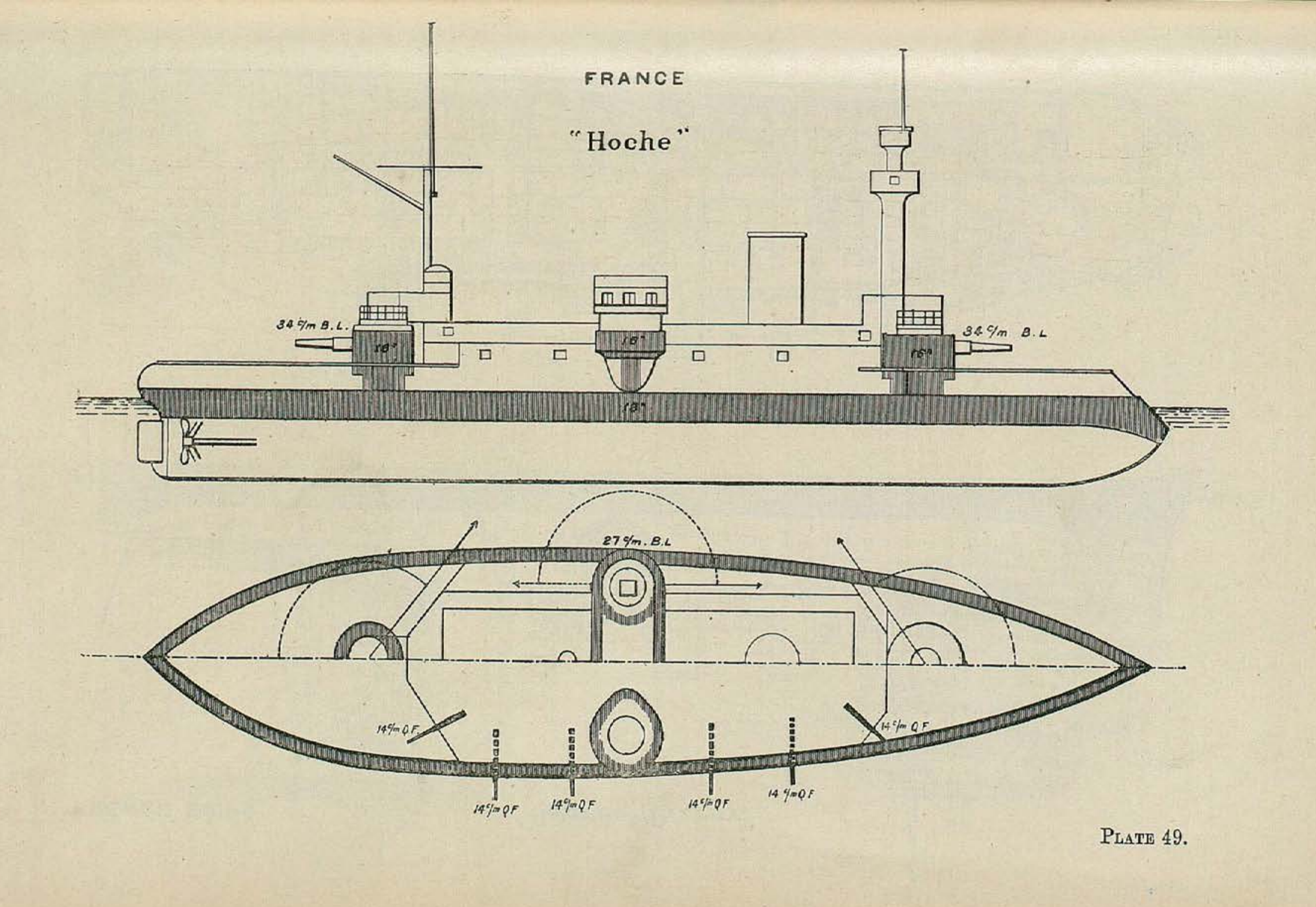


Plate 49.

FRENCH SHIPS.

"Jauréguiberry."

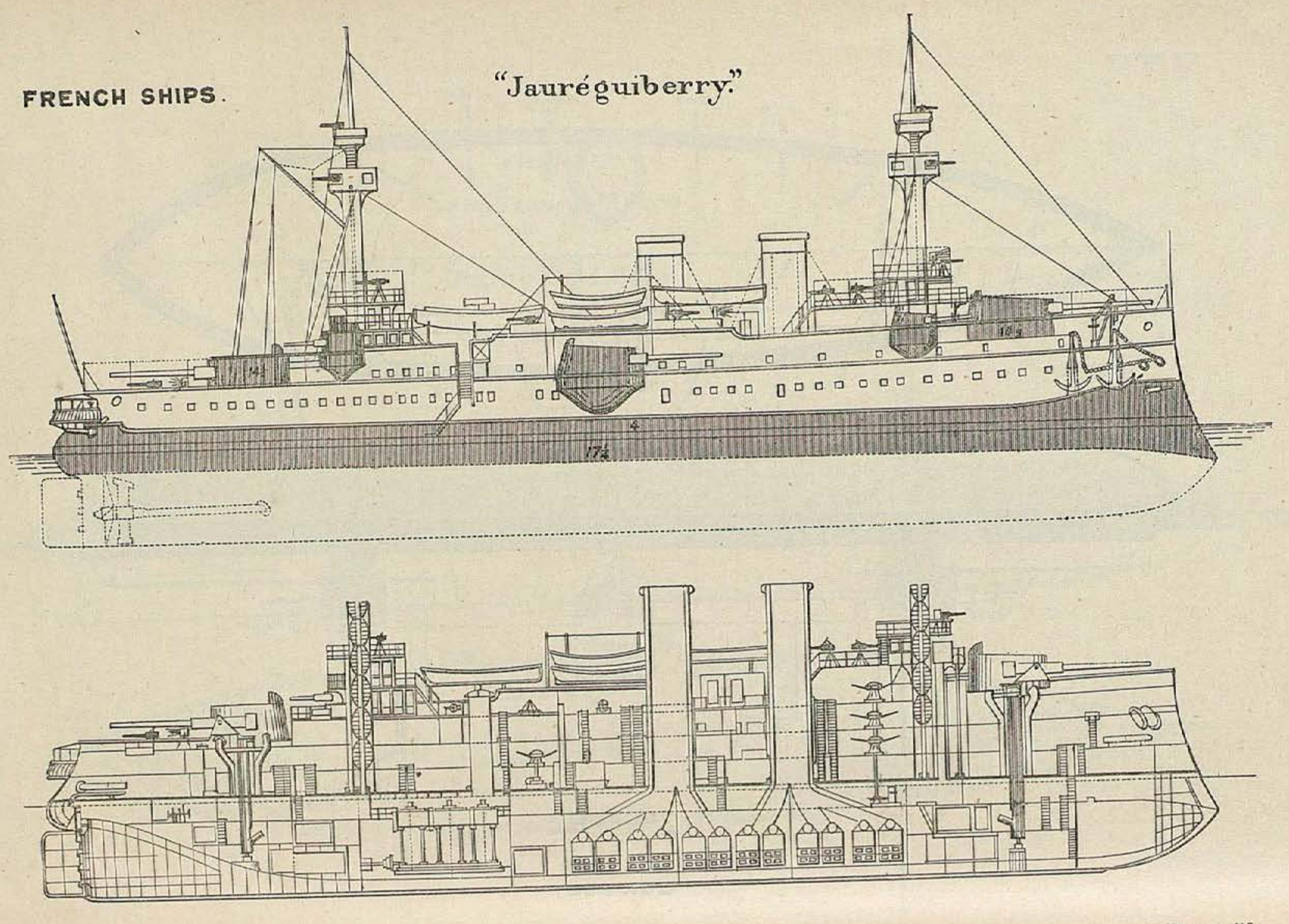


PLATE 50.

FRANCE

"Jauréguiberry."

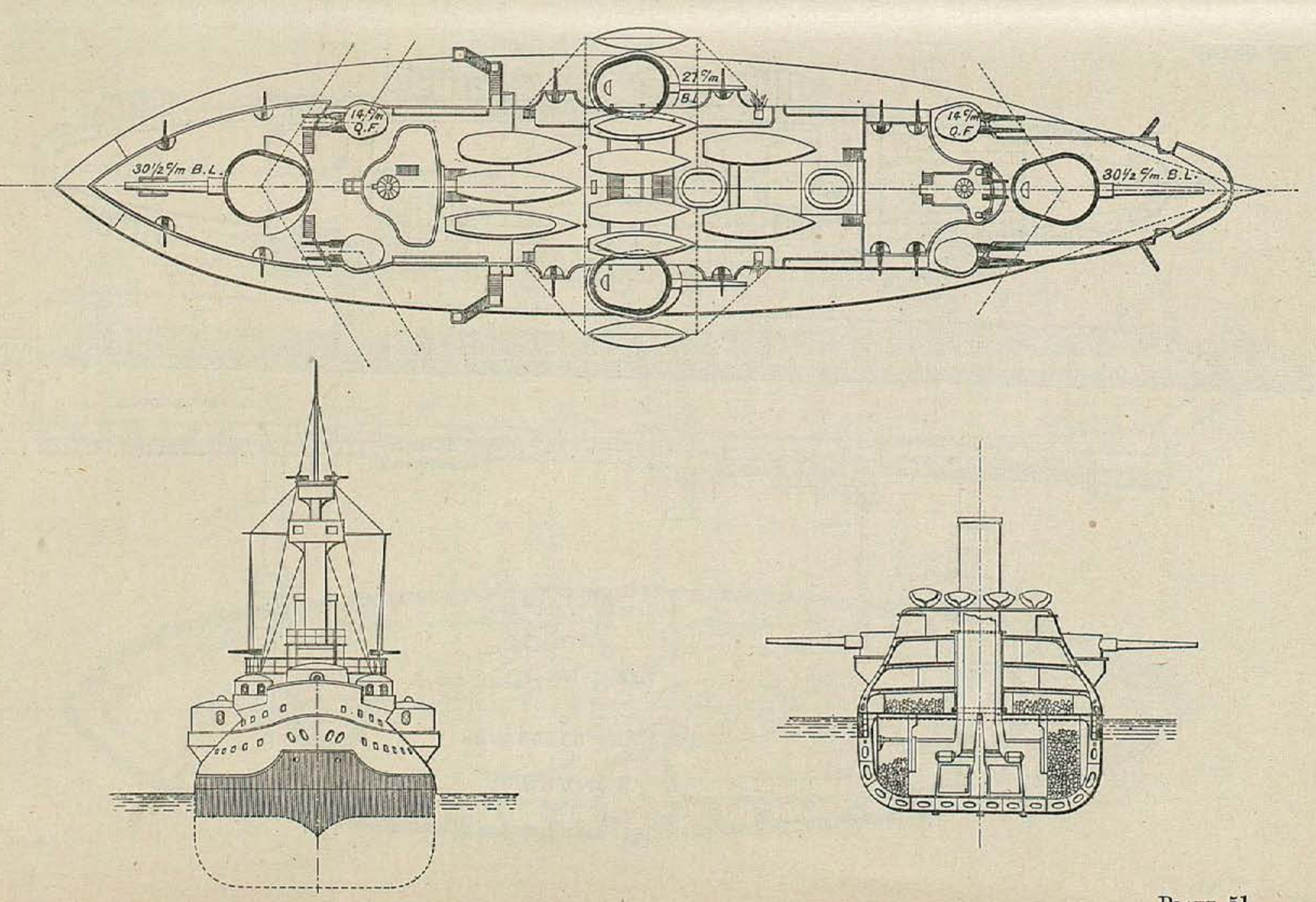


PLATE 51.

FRANCE

PROTECTED CRUISERS

"Jean-Bart"
"Alger"
"Isly"

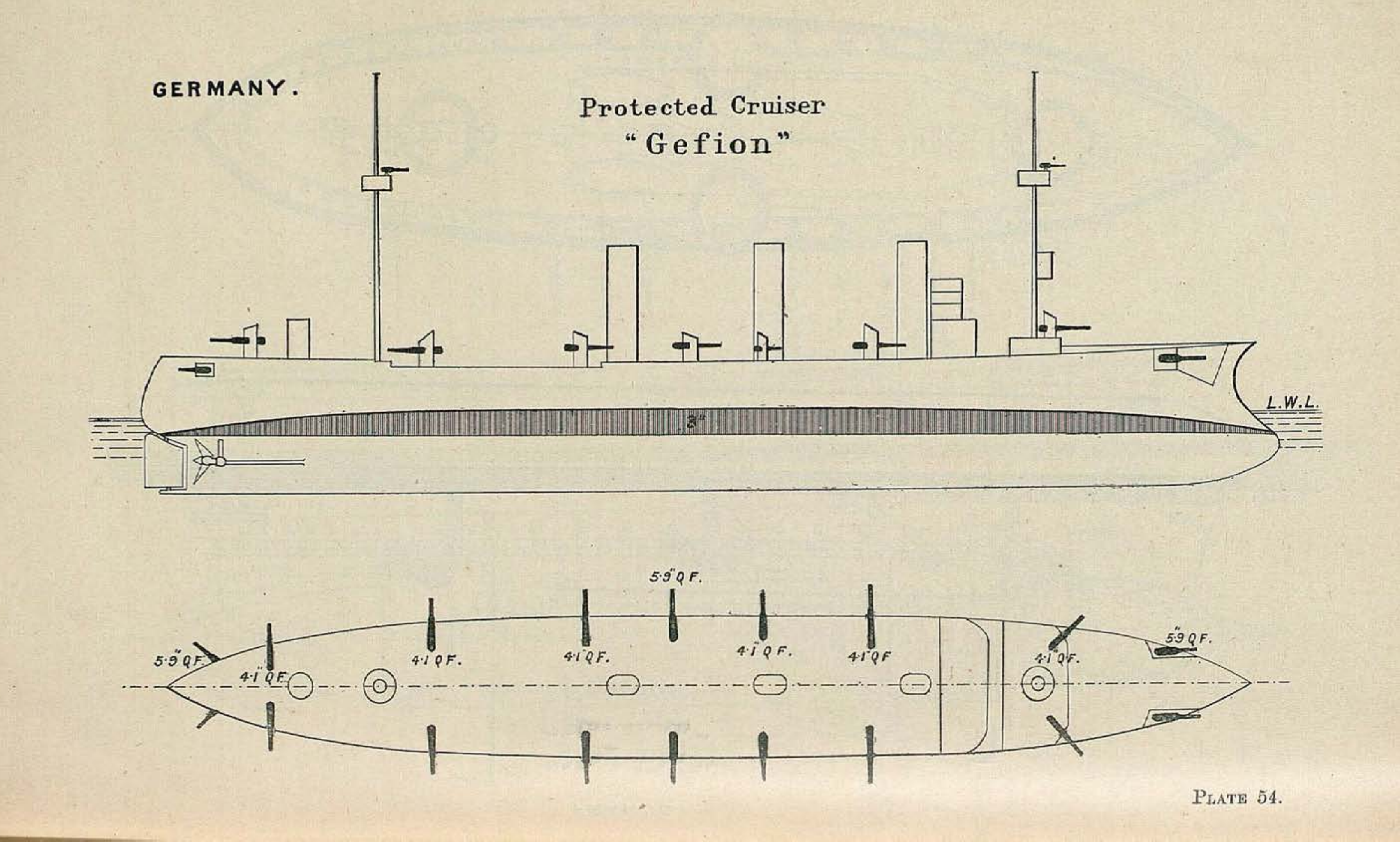
16 c/m. Q.F.
14 c/m. Q.F.
14 c/m. Q.F.
16 c/m Q.F.
16 c/m Q.F.

PLATE 52.

FRANCE

"Magenta"
"Marceau"
"Neptune"

Plate 53.


GERMANY.
Protected Cruiser
"Gefion"
L.W.L.
3"
5·9" Q F.
5·9" Q F.
4·1" Q F.
4·1 Q F.
4·1" Q F.
4·1" Q F.
4·1" Q F
4·1" Q F.
5·9 Q F.

GERMANY.

"Kaiserin Augusta"

L.W.L.

3"

8·8 c.m. Q.F.

15 c.m.

15 c.m.

15 c.m.

15 c.m.

8·8 c.m. Q.F.

15 c.m.

8·8 c.m. Q.F.

8·8 c.m. Q.F.

15 c.m.

PLATE 55.

GERMANY

"Kurfürst Friedrich Wilhelm"
"Brandenburg"
"Weissenburg"
"Wöerth"

11¾"
11¾"
11¾"
L. W. L.
15¾" — 11¾"
4·1" QF
4·1" QF
4·1" QF
28 c.m
28 c.m.
28 c.m.

GERMANY

"Oldenburg"

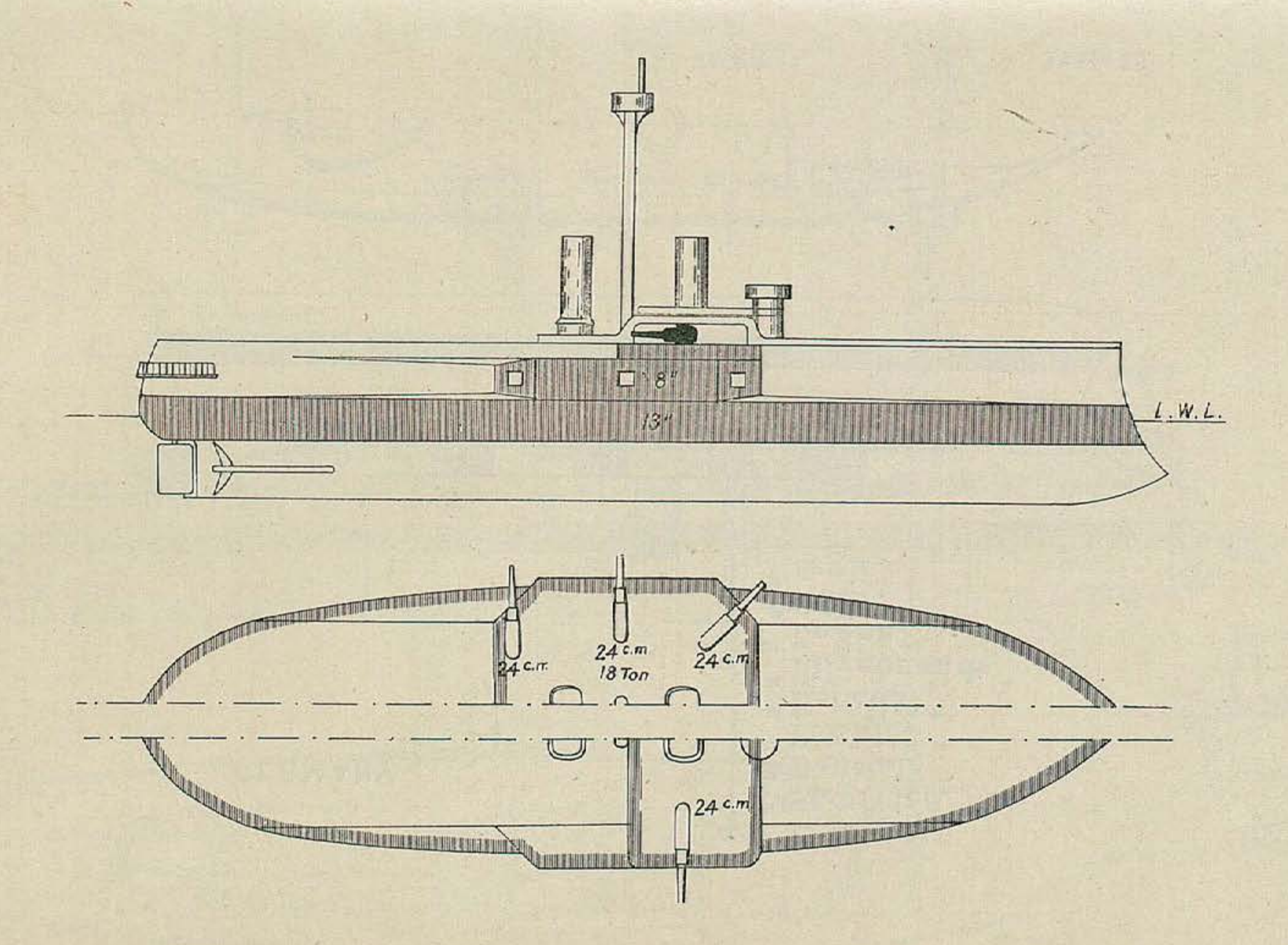
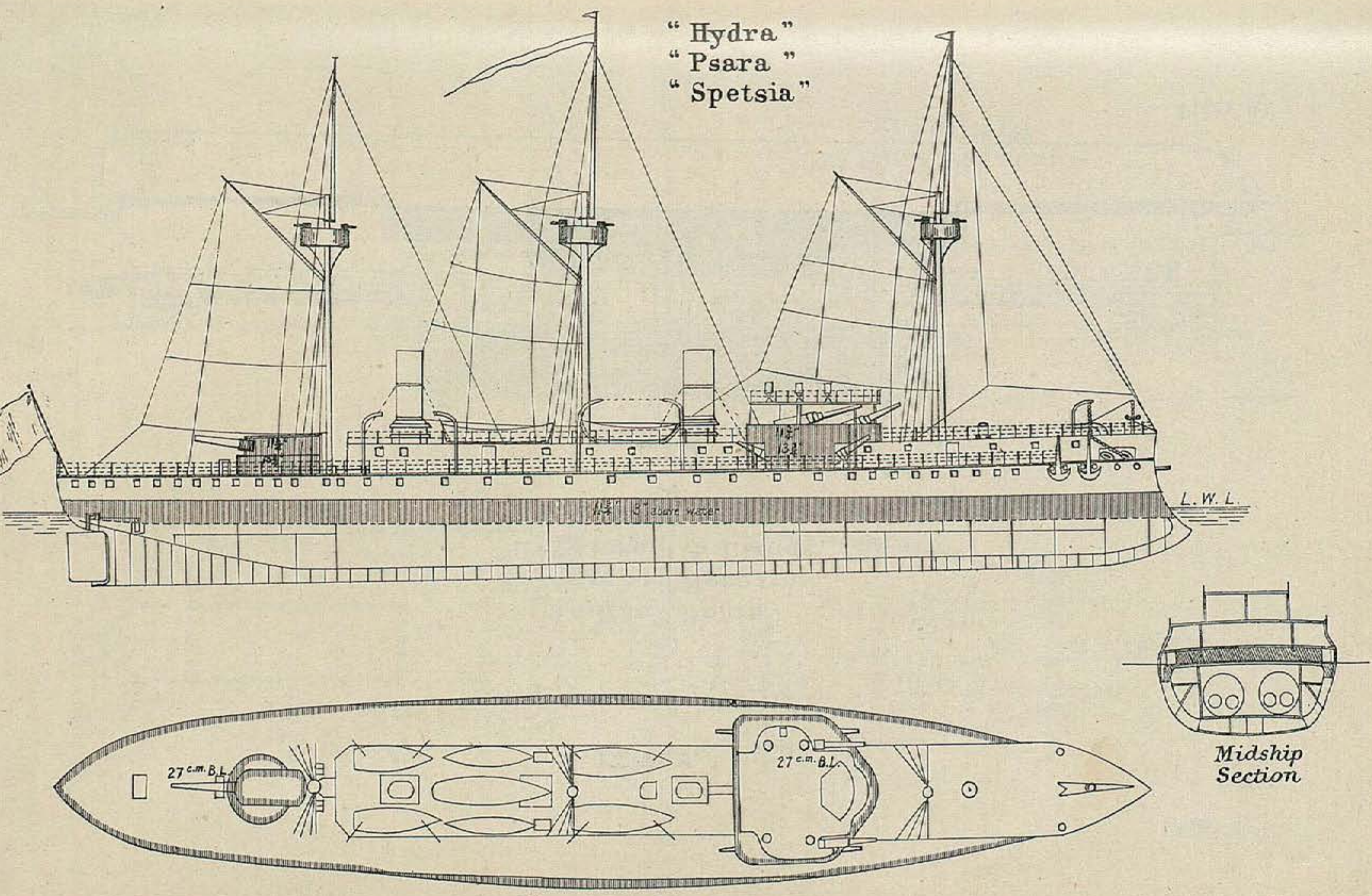


PLATE 57.

GERMANY

"Siegfried"
"Beowulf"
"Frithjof"
"Heimdal"
"Hildebrande"
"Hagen"
"Odin,"
"Aegir"

8"
8"
9½"
L.W.L.
24 c.m.
8¾ c.m. Q.F
8¾ c.m. Q.F
8¾ c.m. Q.F
24 c.m.


"Hydra"
"Psara"
"Spetsia"
L.W.L.
8" above water
27 c.m. B.L.
27 c.m. B.L.
Midship Section
Upper Deck

ITALY.

"Andrea Doria"
"Francesco Morosini"
"Ruggiero di Lauria"

2-12c/m Q.F.
1 15c/m Q.F.
103 ton B.L.
18"
12"
103 ton B.L.
2-12c/m QF 1-15c/m QF
L.W.L.

PLATE 60.

ITALY.

"Dandolo"
(As refitted and rearmed)

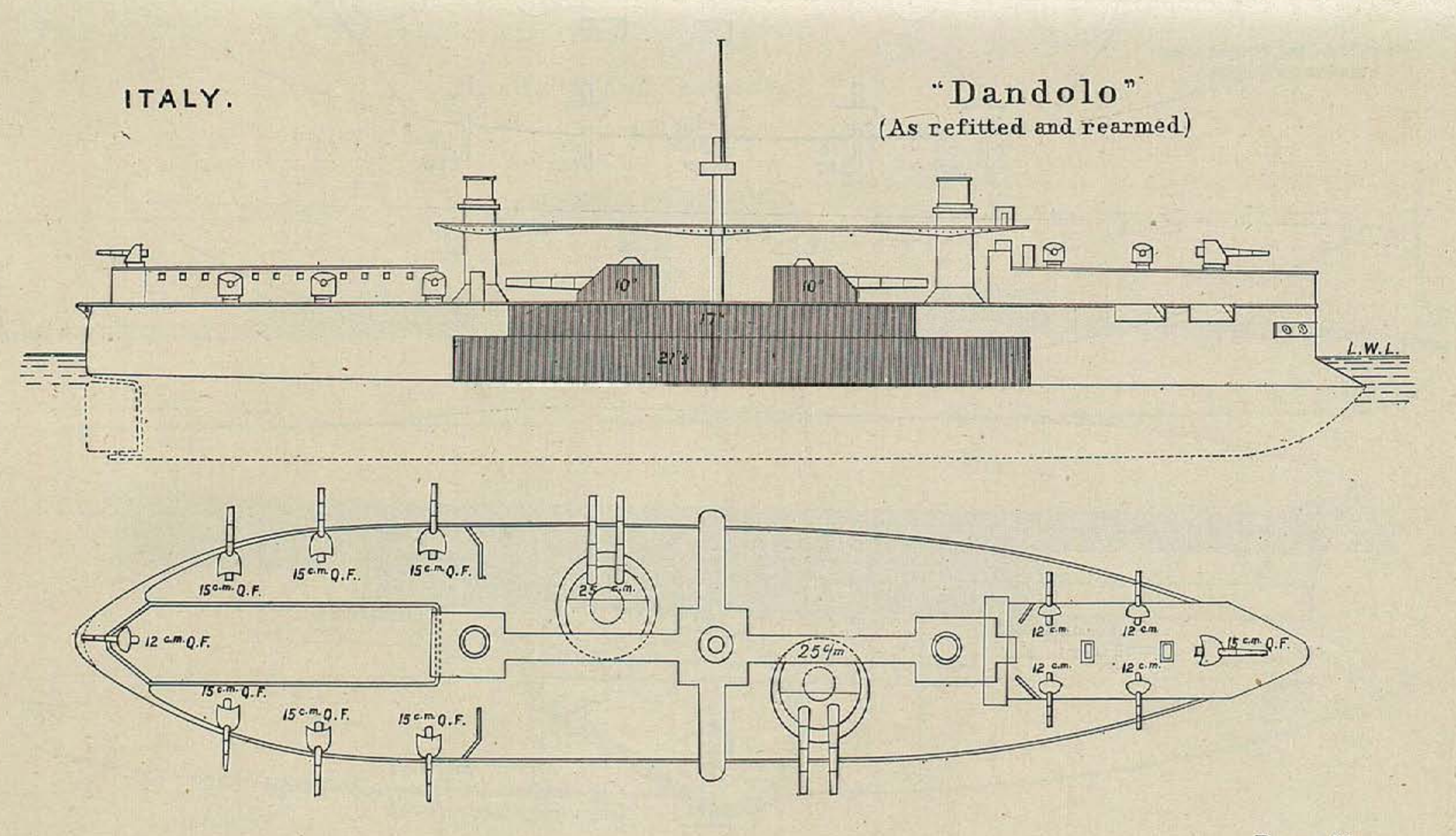


Plate 61.

ITALY.

"Guiseppe Garibaldi"

"Varese"

"San Martin" } Intended for the Italian Navy subsequently purchased by Argentina.

L.W.L

12 c/m Q.F

12 c/m Q.F

12 c/m Q.F

152 m/m Q.F

152 m/m Q.F

152 m/m Q.F

152 m/m Q.F

152 m/m Q.F

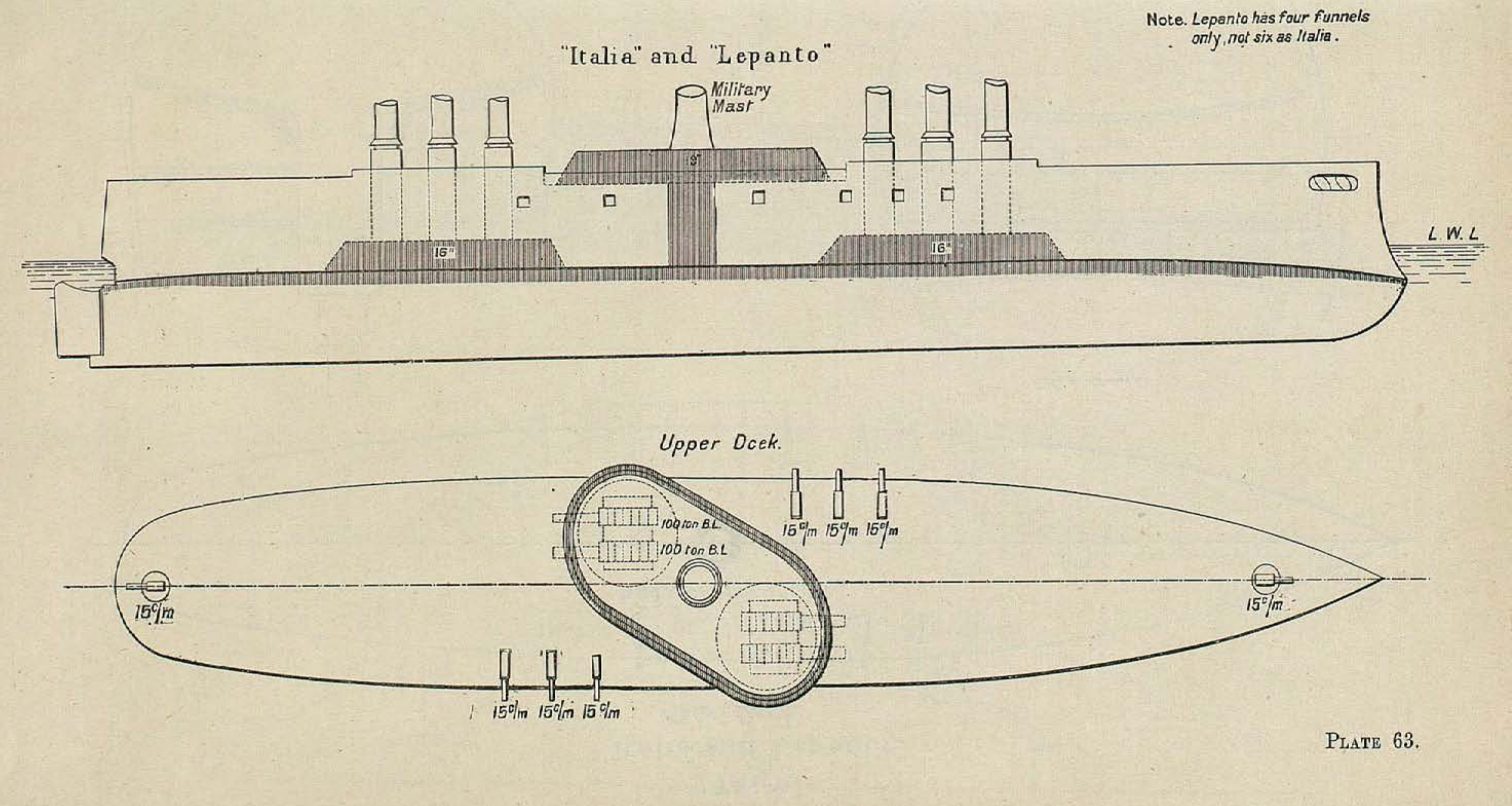
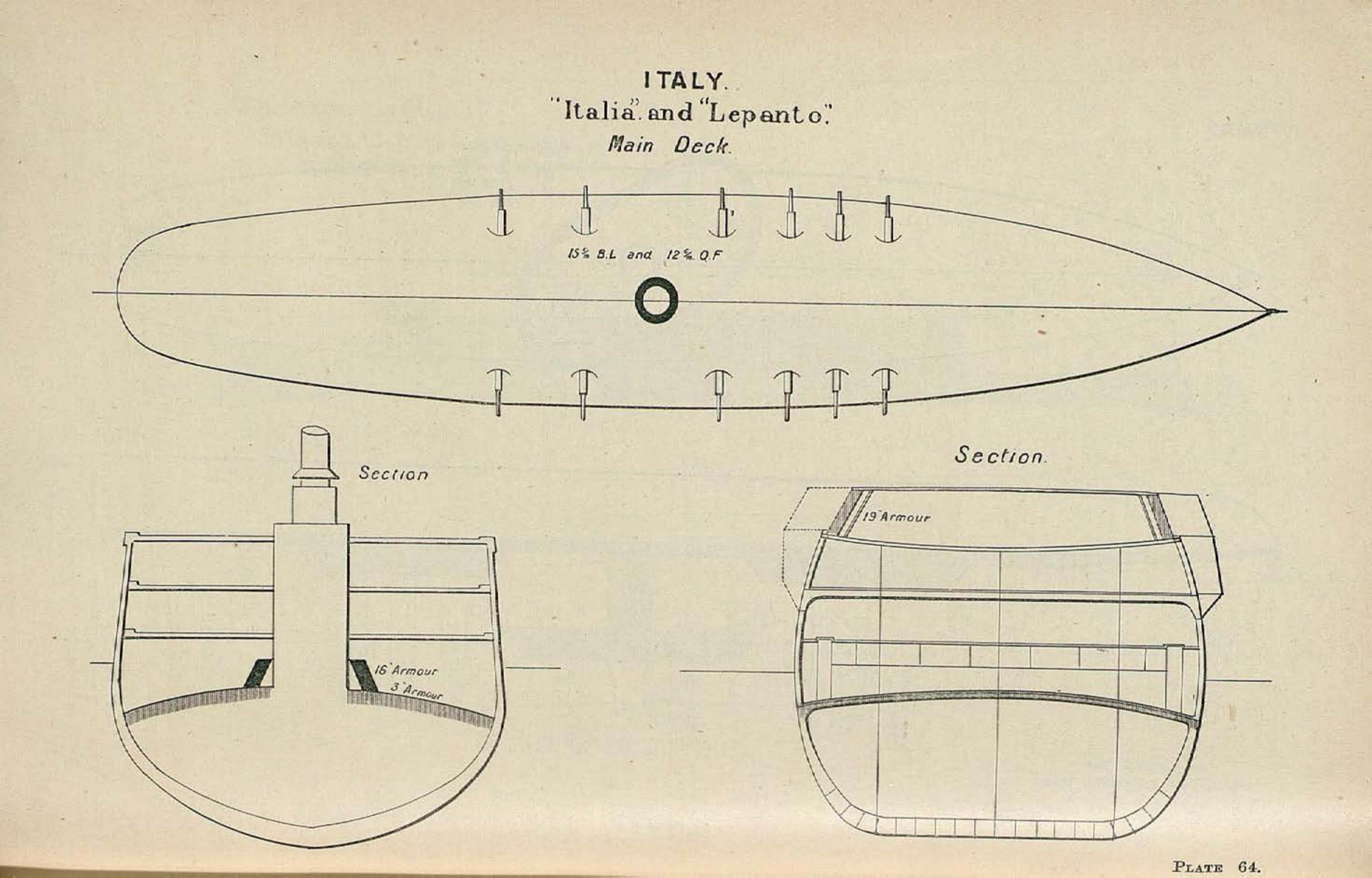

"Italia" and "Lepanto"
Note. Lepanto has four funnels only, not six as Italia.
Military Mast
9"
16"
16"
L. W. L
Upper Dcek.
100 ton B.L
100 ton B.L
15 c/m 15 c/m 15 c/m
15 c/m 15 c/m 15 c/m
15 c/m
15 c/m

Plate 63.


ITALY.
"Italia" and "Lepanto."
Main Deck.
15⅝ B.L and 12⅝ Q.F
Section
16" Armour
3" Armour
Section.
19" Armour

"Saint-Bon"
"Emanuele Filiberto"

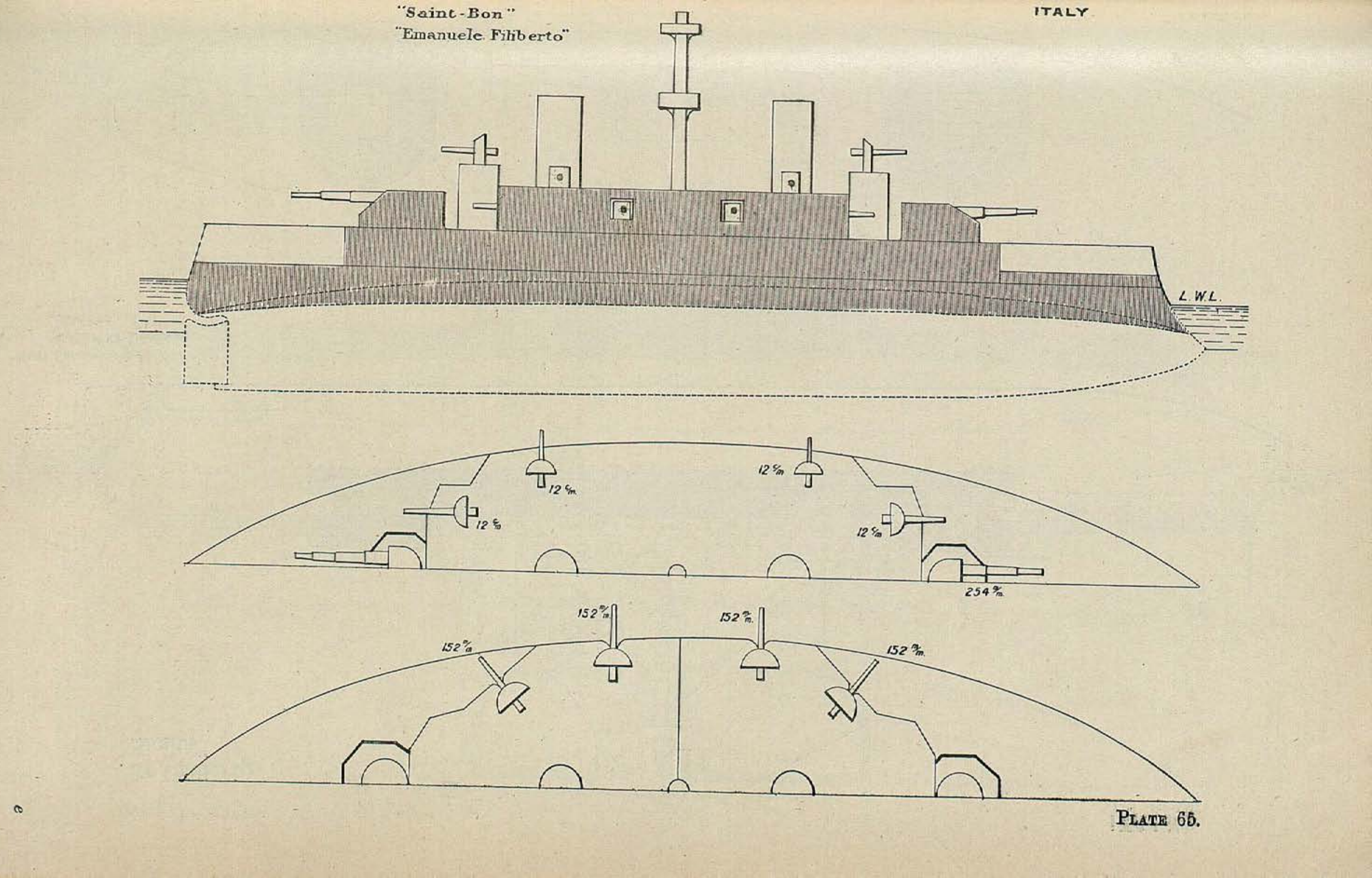
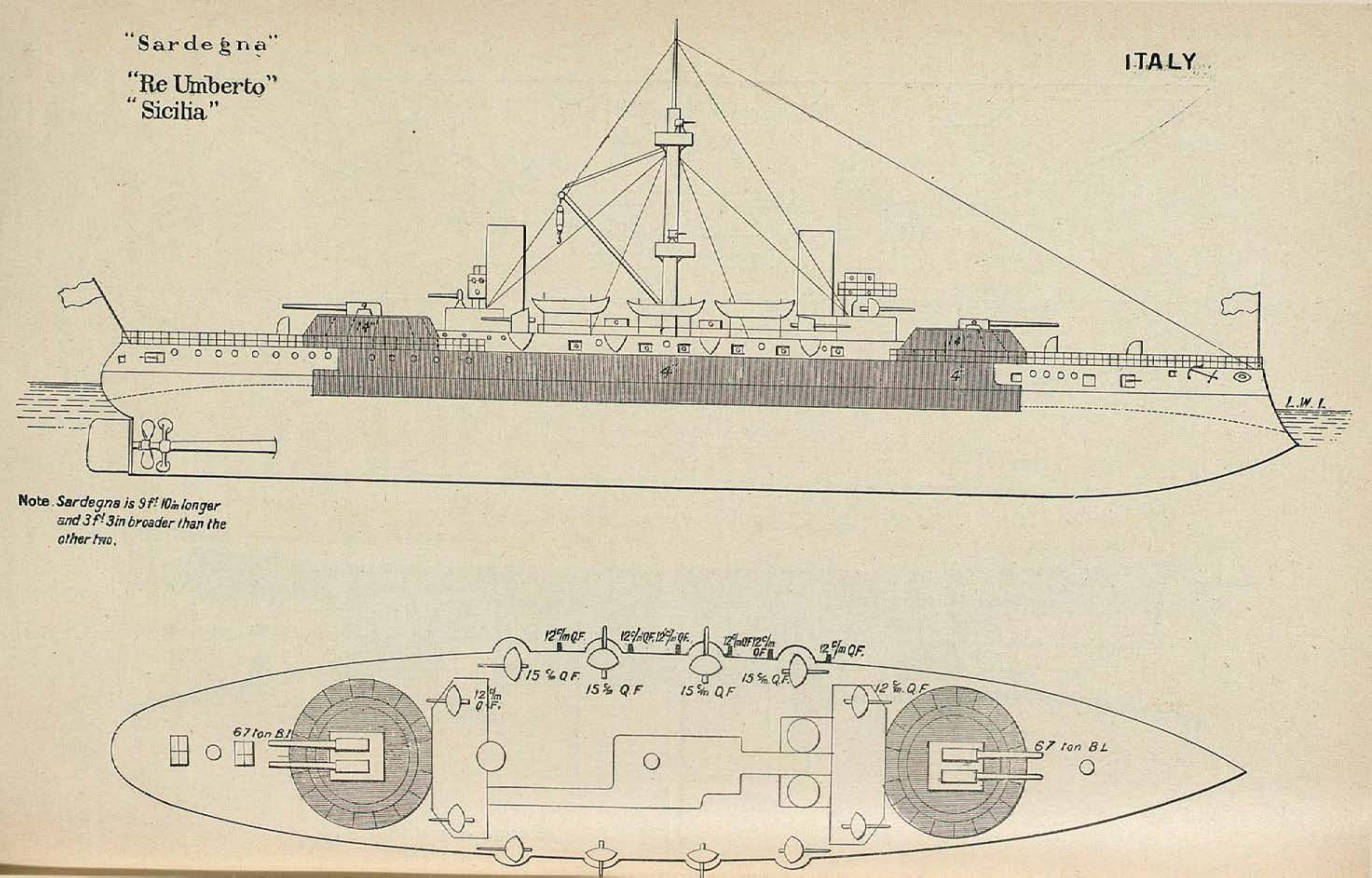


PLATE 65.


"Sardegna"
"Re Umberto"
"Sicilia"
ITALY
14"
4"
4"
14"
L.W.L.
Note. Sardegna is 9 ft. 10 in. longer
and 3 ft. 3 in. broader than the
other two.
12 c/m Q.F.
12 c/m Q.F. 12 c/m Q.F.
12 c/m Q.F. 12 c/m Q.F.
12 c/m Q.F.
15 c/m Q.F.
15 c/m Q.F.
15 c/m Q.F.
15 c/m Q.F.
12 c/m Q.F.
12 c/m Q.F.
67 ton B.L.
67 ton B.L.

ITALY

"Vettor-Pisani"

"Carlo-Alberto"

6"

6"

L.W.L.

152 m/m Q F

12 c/m Q F

12 c/m Q F

152 m/m Q F

6 in

6 in

12 c/m Q F

12 c/m Q F

152 m/m Q F

152 m/m Q F

152 m/m Q F

152 m/m Q F

57 m/m Q F

Light Screen

6 in

6 in

Light Longitudinal Screen at Middle line

PLATE 67.

JAPAN.

"Chen Yuen"

Taken from the Chinese

L.W.L.

15 cm

$30\frac{1}{2}$ c.m.

$30\frac{1}{2}$ c.m.

15 cm

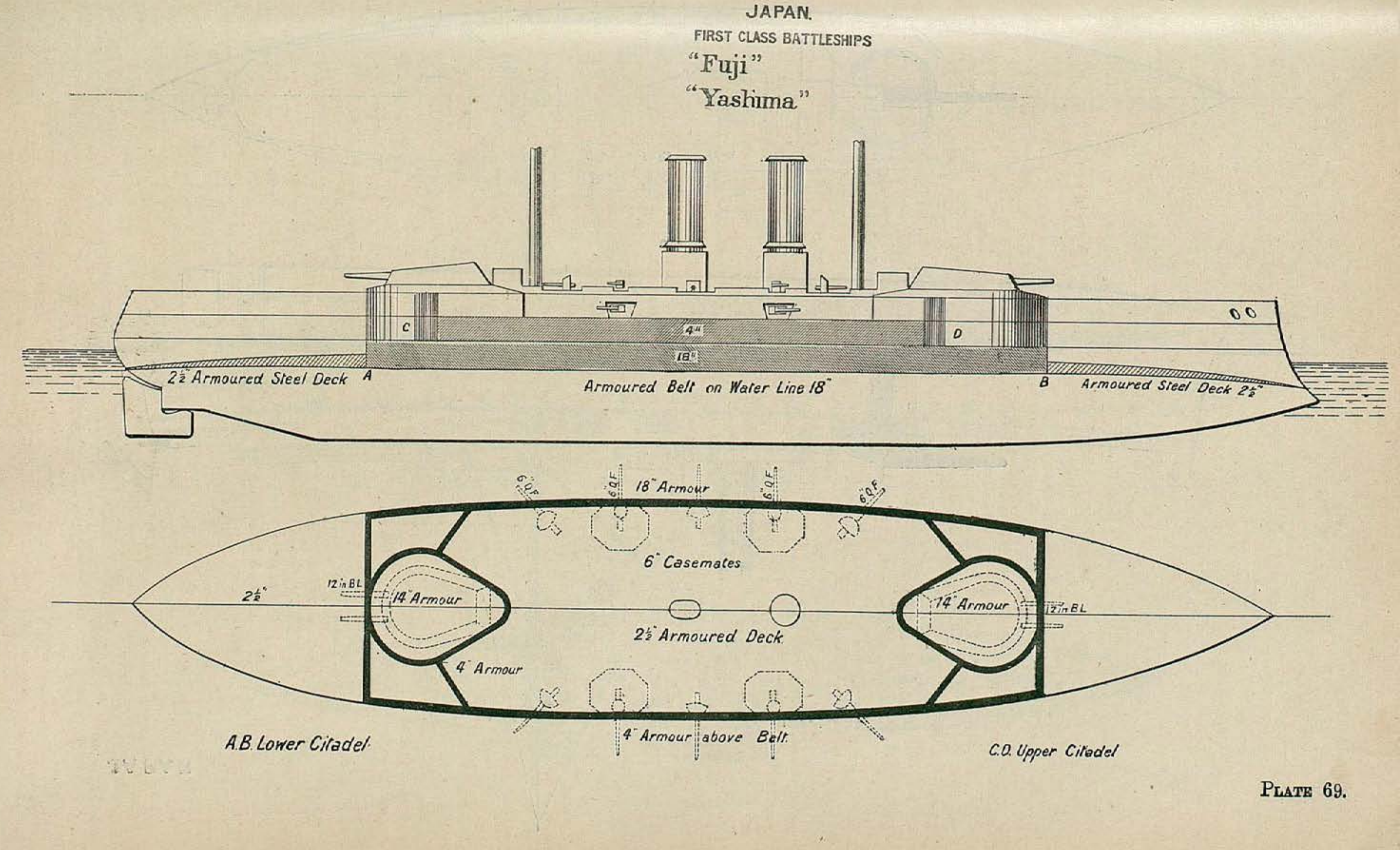

JAPAN.
FIRST CLASS BATTLESHIPS
"Fuji"
"Yashima"
C
D
4"
18"
2½" Armoured Steel Deck
A
Armoured Belt on Water Line 18"
B
Armoured Steel Deck 2½"
6" Q.F.
18" Armour
6" Casemates
2½"
12 in BL
14" Armour
2½" Armoured Deck
4" Armour
4" Armour above Belt
A.B. Lower Citadel
C.D. Upper Citadel

PLATE 69.

JAPAN.

"Itsukusima"

2"

12 c/m 12 c/m 12 c/m 12 c/m

12 c/m

32 c/m B.L

PLATE 70.

JAPAN

"Tatsuta."

On Special Scale

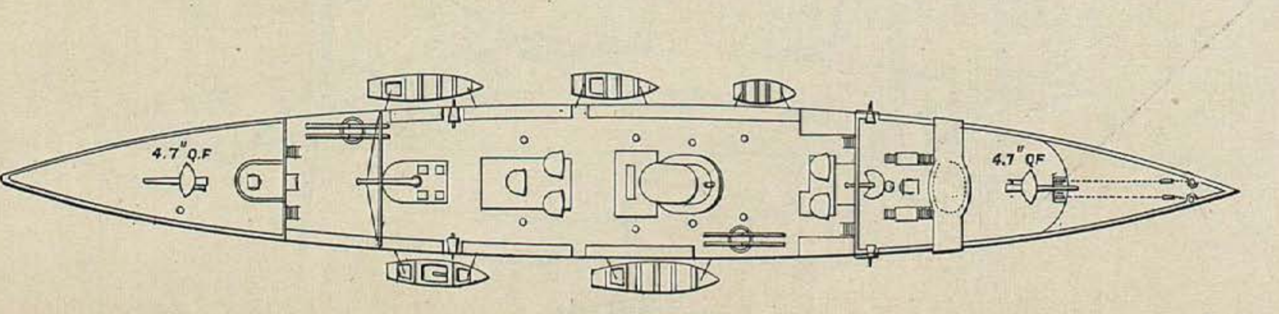


PLATE 71.

JAPAN.

"Yoshino."

4·7in Q.F
4·7in Q.F
4·7in Q.F
4·7in Q.F
6in Q.F
6in Q.F
6in Q.F

NETHERLANDS

"Evertsen"
"Piet Hein"
"Kortenaer"

9½
9½
9½
6"
L. W. L.

21 c/m B L.
75 m/m Q F
15 c/m B L.
75 m/m Q F
75 m/m Q F
21 c/m B L.

PLATE 73.

NETHERLANDS

"Princess Wilhelmina"

17cm BL
21cm BL
28cm BL.

PLATE 74.

NETHERLANDS

"Reinier Claesen".

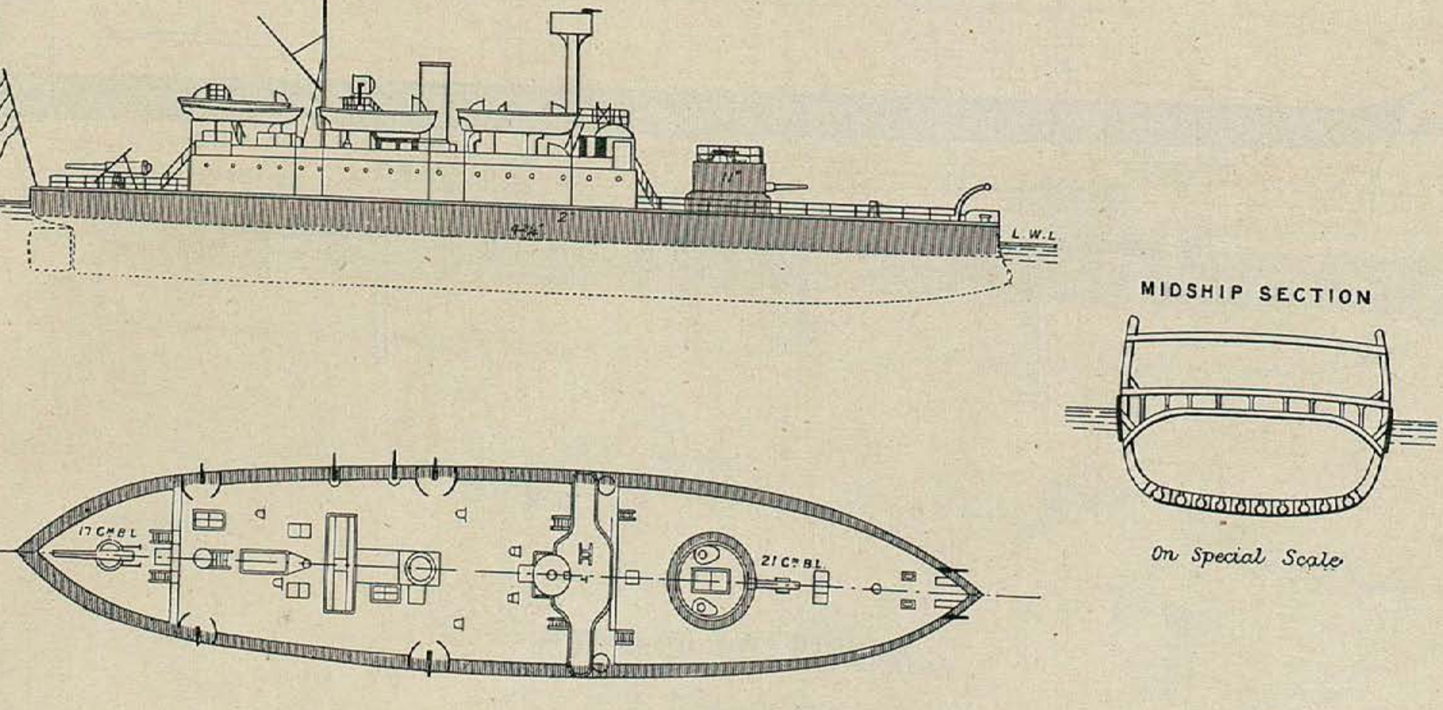


PLATE 75.

RUSSIA

"Admiral Nachimoff

8"
8"
8"
10"
6" B.L
6" B.L
8" B.L.
6" B.L
6" B.L
6" B.L
8" B.L.
8" B.L

PLATE 76.

RUSSIA

"Alexander II"

Belt
On Special Scale

14 Cpd Arm : 12 Oak : 1 Steel

3'
3'
2'
6'

9" B.L.
4"
9" B.L.
4"
10"
14"
L. W. L.

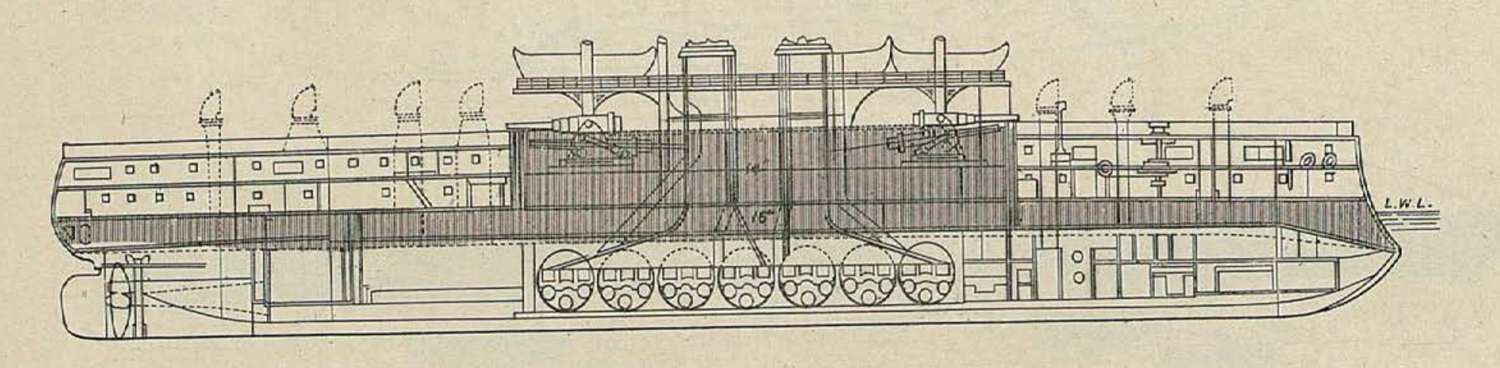
6" B.L.
6" B.L.
9" B.L.
9" B.L.
6" B.L.
6" B.L.
2-12" 50 ton

Light Superstructure - Wood

PLATE 77.

RUSSIA.

"Catherine II." "Tchsmé." "Sinope."



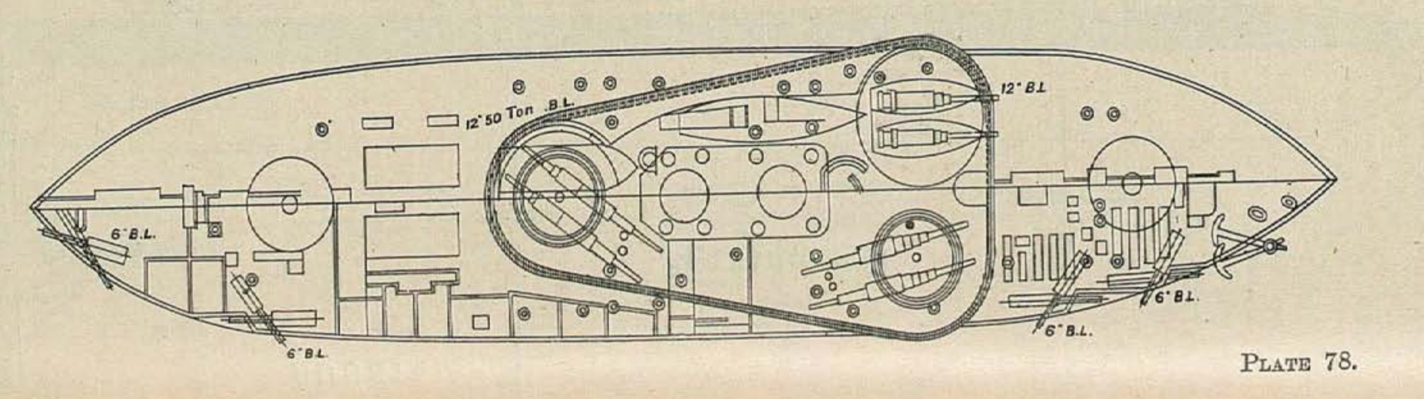


PLATE 78.

"Sissoi Veliky"

RUSSIA

"Nicolai I."

PLATE 80.

"Pamyat Azova."

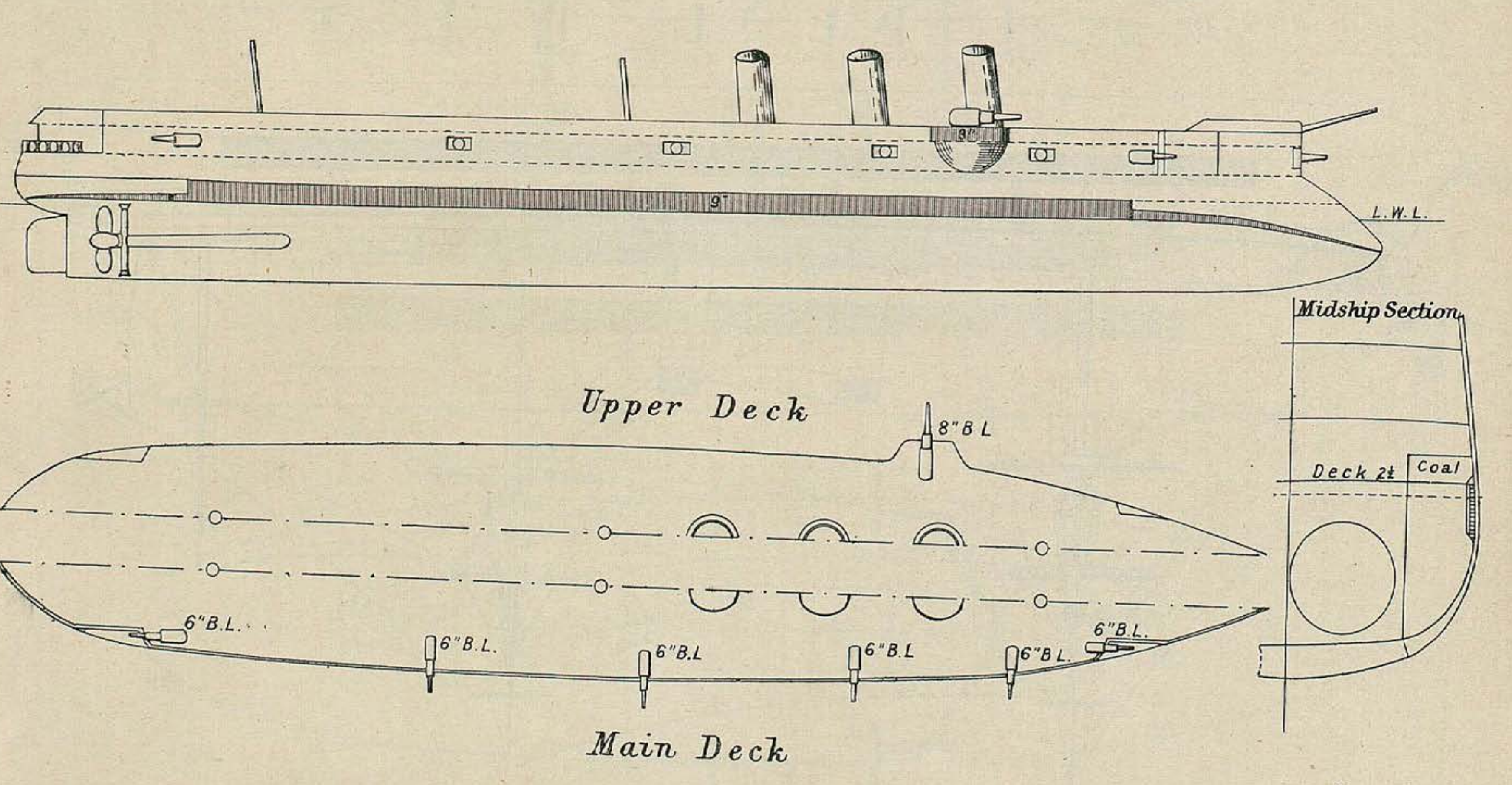


PLATE 81.

First Class Cruiser "Rurik."

L.W.L.

10"

6" Q.F.

8"

6" Q.F.

6" Q.F.

4"·7 Q.F.

6" Q.F.

4"·7 Q.F.

6" Q.F.

6" Q.F.

4"·7 Q.F.

6" Q.F.

8"

6" Q.F.

Br.

RUSSIA.

"Tria Sviatitelia"

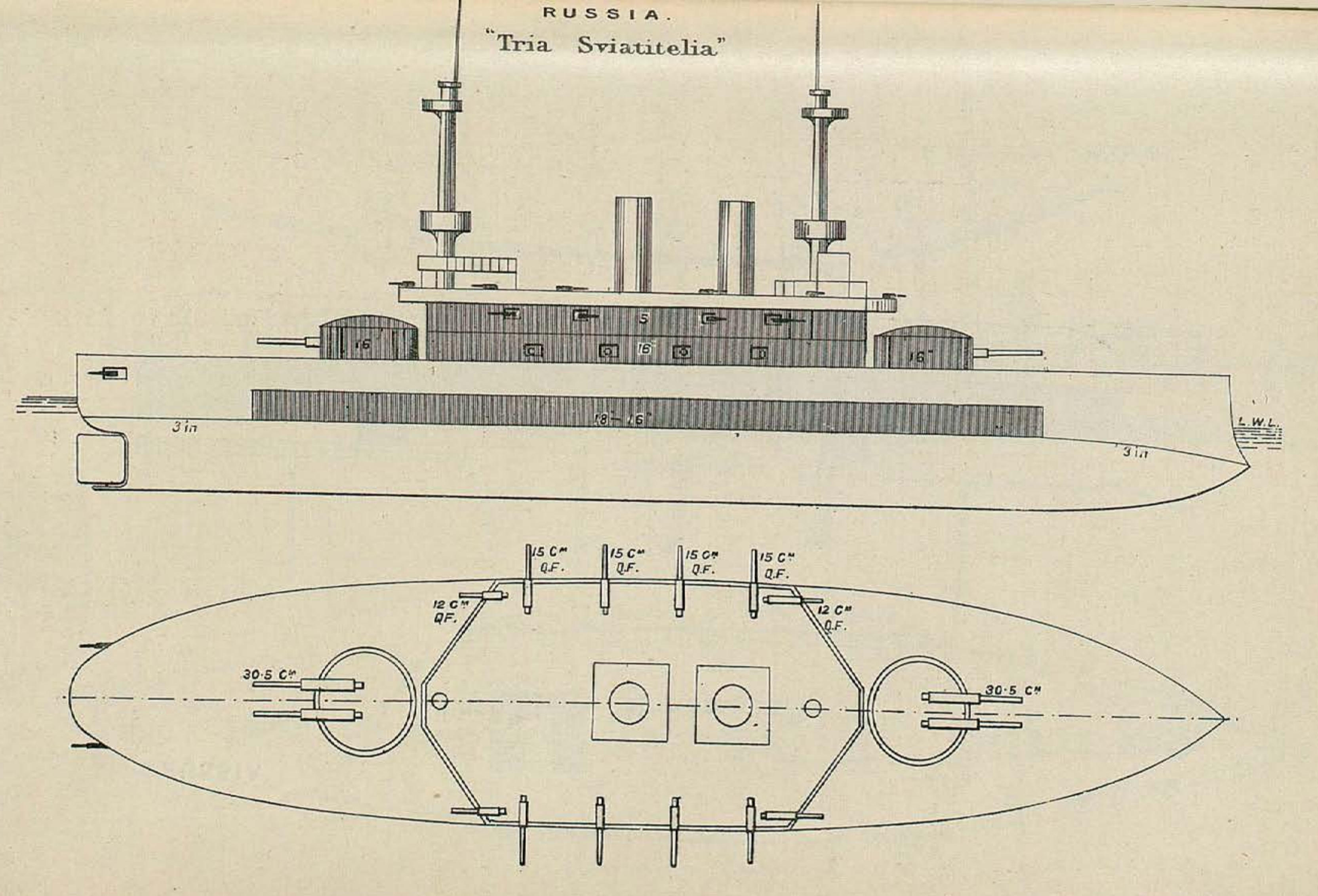


PLATE 83.

RUSSIA

"Vladimir Monomach"

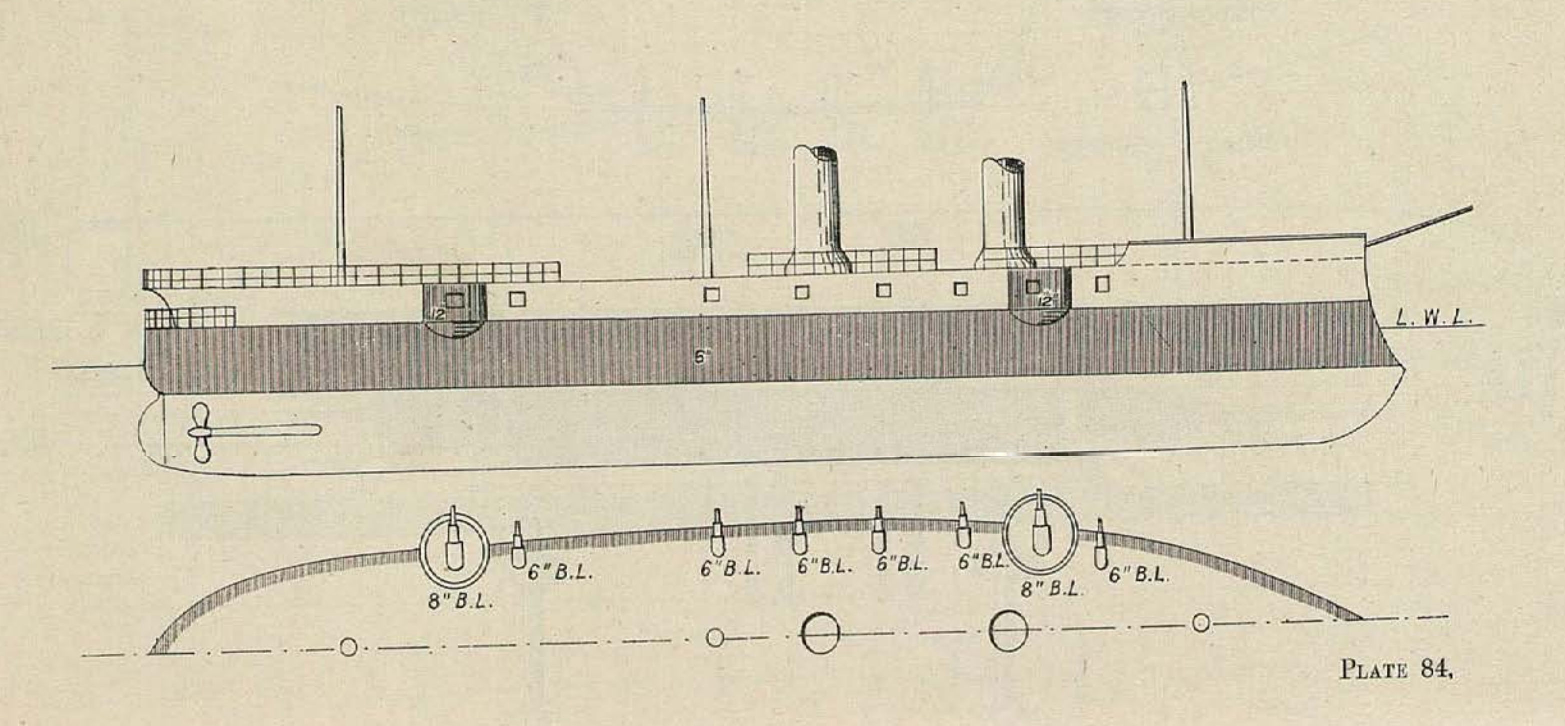


PLATE 84.

"Emperador Carlos V."

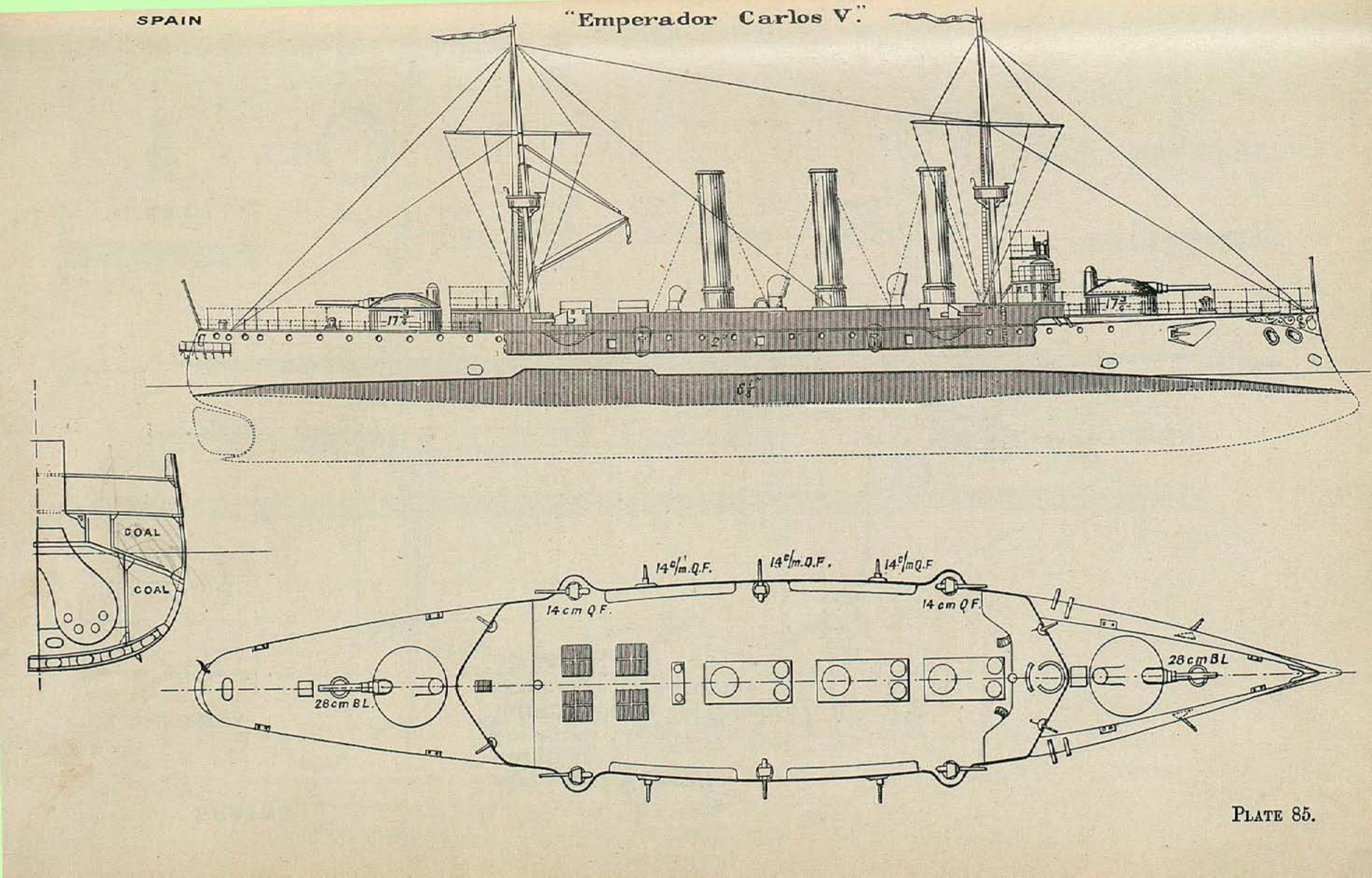


PLATE 85.

SPAIN

"Almirante Oquendo"
"Catalĩina"
"Cardenal Cisneros"
"Infanta Maria Téresa"
"Princessa de Asturias"
"Vizcaya"

Midship Section.

"Pelayo"

19¼"
19¼"
17½
L.W.L.
12 c.m. B.L.
12 c.m. B.L.
12 c.m. B.L.
12 c.m. B.L.
12 c.m. B.L.
12 c.m. B.L.
28 c.m. B.L.
32 c.m. B.L.
19¼"
32 c.m. B.L.
16 c.m. B.L.

UNITED STATES.

"Brooklyn"
(Armoured Cruiser)

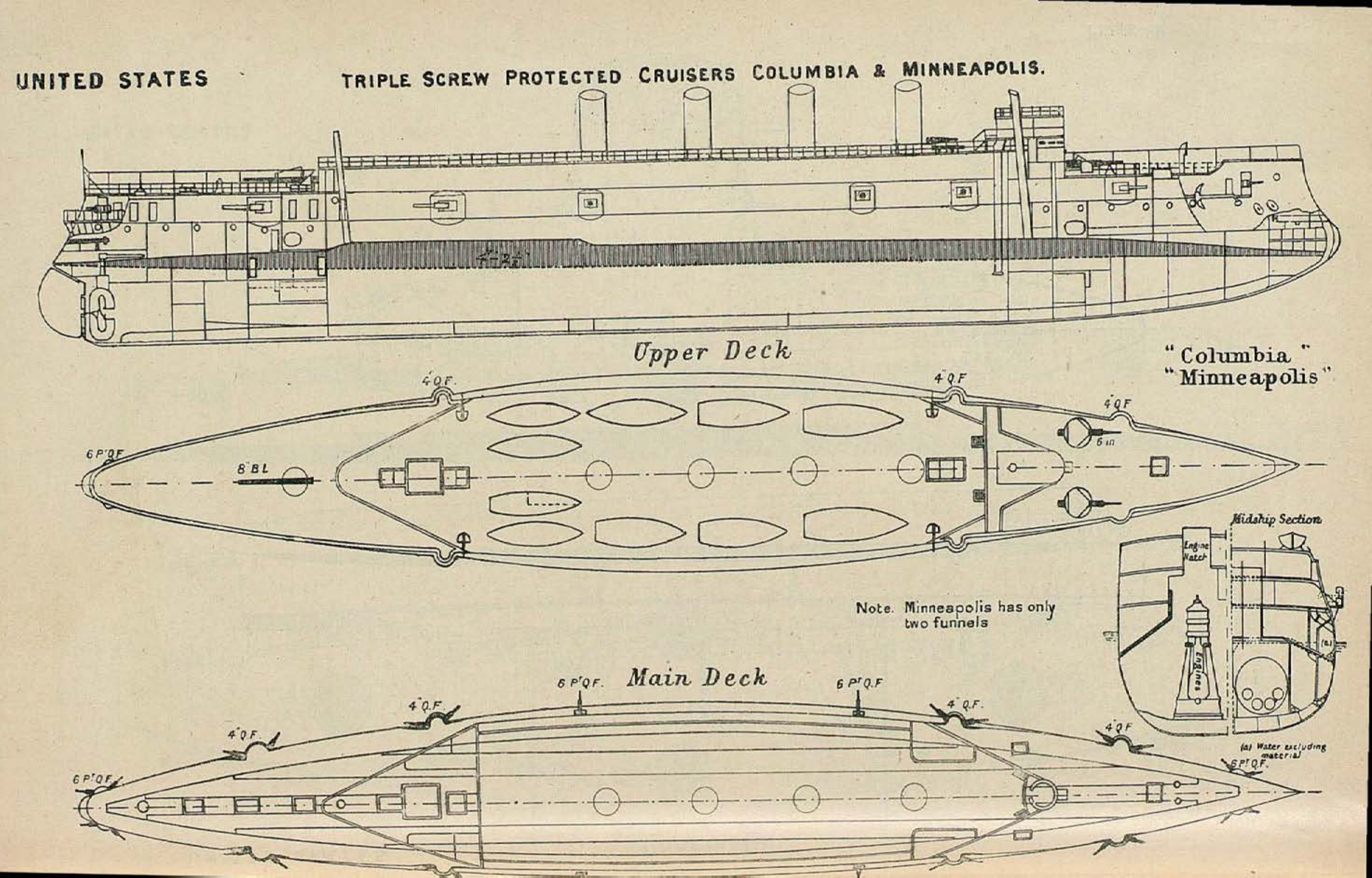
5½"
8"
5½"
8
5½"
8"
L.W.L.
5"–3"
3"
5"–3"

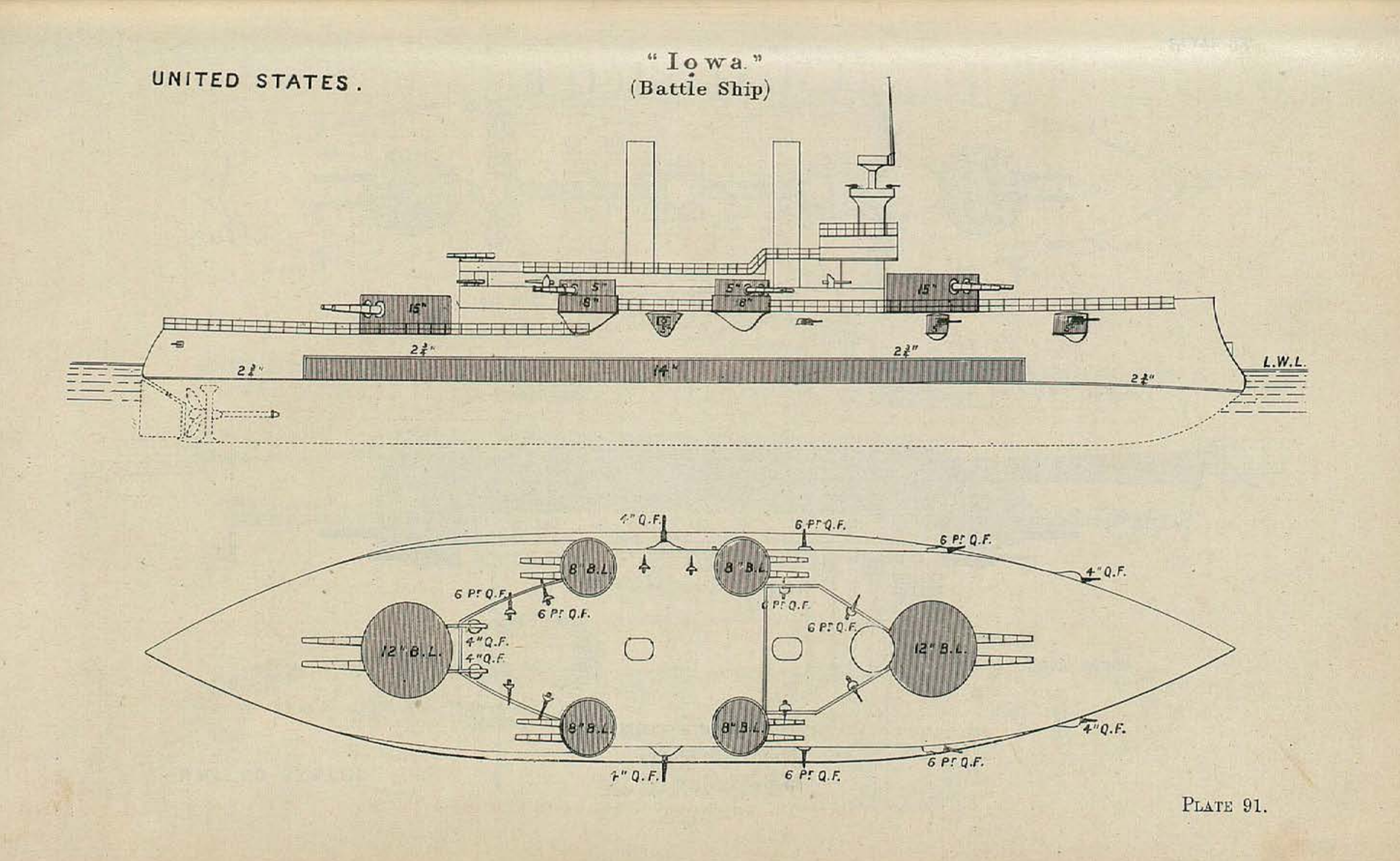
5" Q.F.
6 Pr Q.F.
5" Q.F.
6 Pr Q.F.
5" Q.F.
6 Pr Q.F.
5" Q.F.
8" B.L.
8" B.L.
5" Q.F.
6 Pr Q.F.
5" Q.F.
5" Q.F.
6 Pr Q.F.
5" Q.F.
6 Pr Q.F.
8" B.L.
8" B.L.
5" Q.F.
6 Pr Q.F.
5" Q.F.
5" Q.F.
6 Pr Q.F.
5" Q.F.

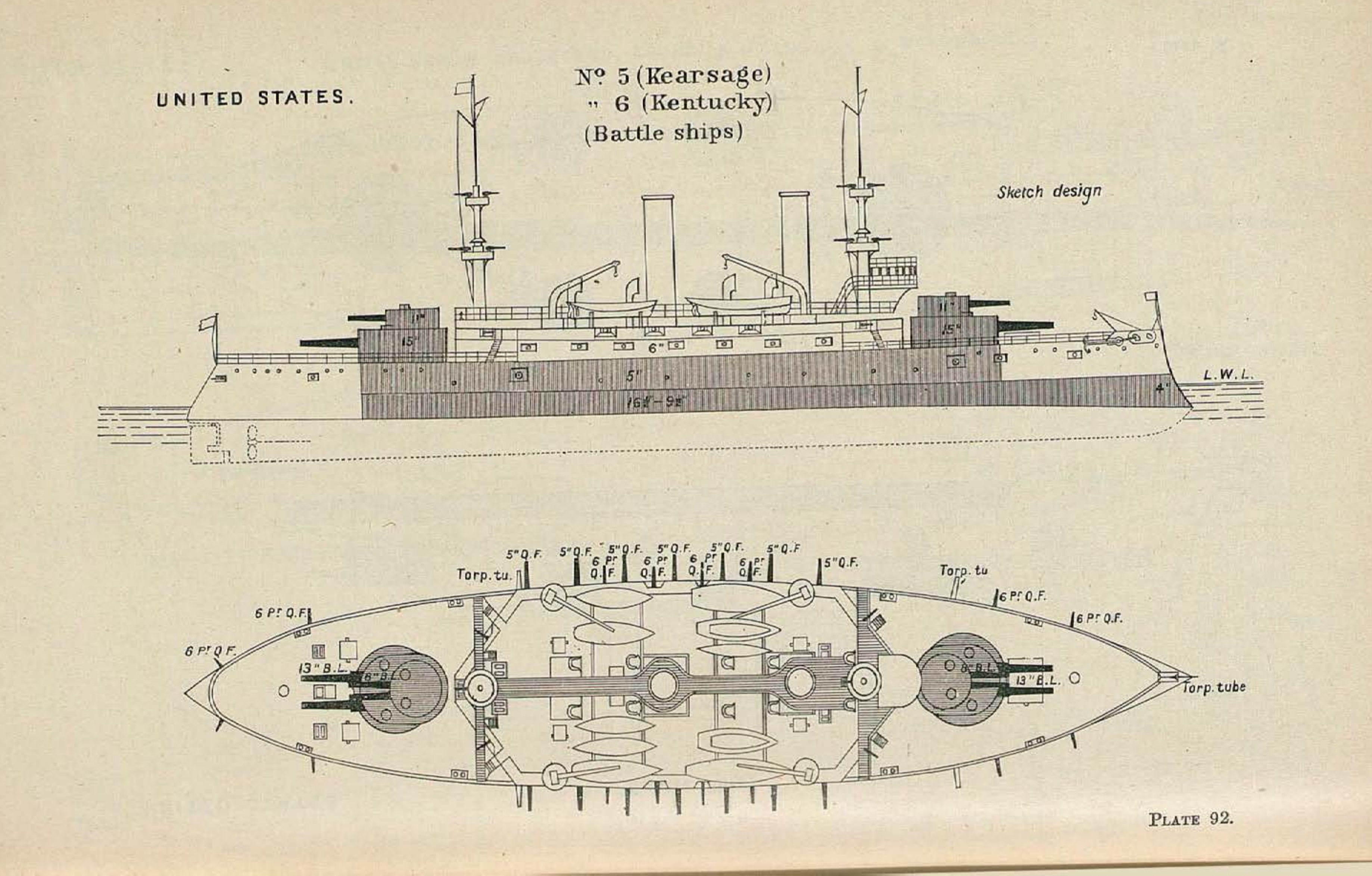
PLATE 88.

"Charleston"

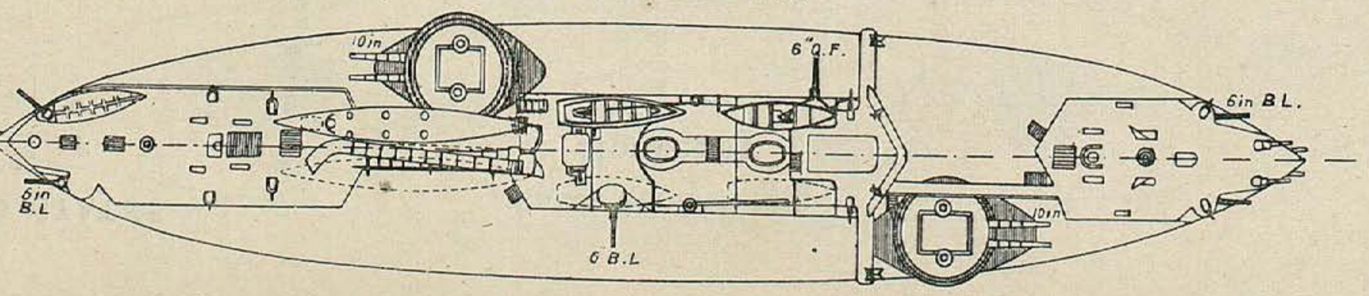
L W L.
8in
6in
6in
8in BL.
8in BL.


UNITED STATES
TRIPLE SCREW PROTECTED CRUISERS COLUMBIA & MINNEAPOLIS.
"Columbia"
"Minneapolis"
Upper Deck
4" Q.F.
4" Q.F
6 P' Q.F
8" B.L
6 in
Midship Section
Engine Hatch
Engines
(a)
Note. Minneapolis has only two funnels
Main Deck
6 P' Q.F.
4" Q.F.
(a) Water excluding material
6 P' Q.F.


UNITED STATES.
"Iowa."
(Battle Ship)
15"
5"
8"
14"
2¾"
L.W.L.
12" B.L.
8" B.L.
6 Pr Q.F.
4" Q.F.
PLATE 91.


UNITED STATES.
Nº 5 (Kearsage)
" 6 (Kentucky)
(Battle ships)
Sketch design
L.W.L.
15"
11"
6"
5"
16½"–9½"
4"
5"Q.F.
6 Pr Q.F.
Torp. tu.
6 Pr Q.F.
13" B.L.
8" B.L.
Torp. tu
Torp. tube

Armoured Cruiser "Maine"



UNITED STATES

Coast Defence Ship
"Monterey"

L.W.L.

13½"

10in BL.

6cm QF

6cm QF

6cm QF

12in BL.

Midship Section.

On Special Scale

PLATE 94.

UNITED STATES

ARMOURED CRUISER.

"New York"

PLATE 95.

UNITED STATES

BATTLE SHIPS.

"Oregon"
"Massachusets"
"Indiana"

15
17"
8"
6
5"
18"
8"
5
10"
15"
17"
LWL

8"B.L.
6" B.L.
6P.Q.F.
6" B.L
8" B.L
13" B.L
13" B.L.

PLATE 96.

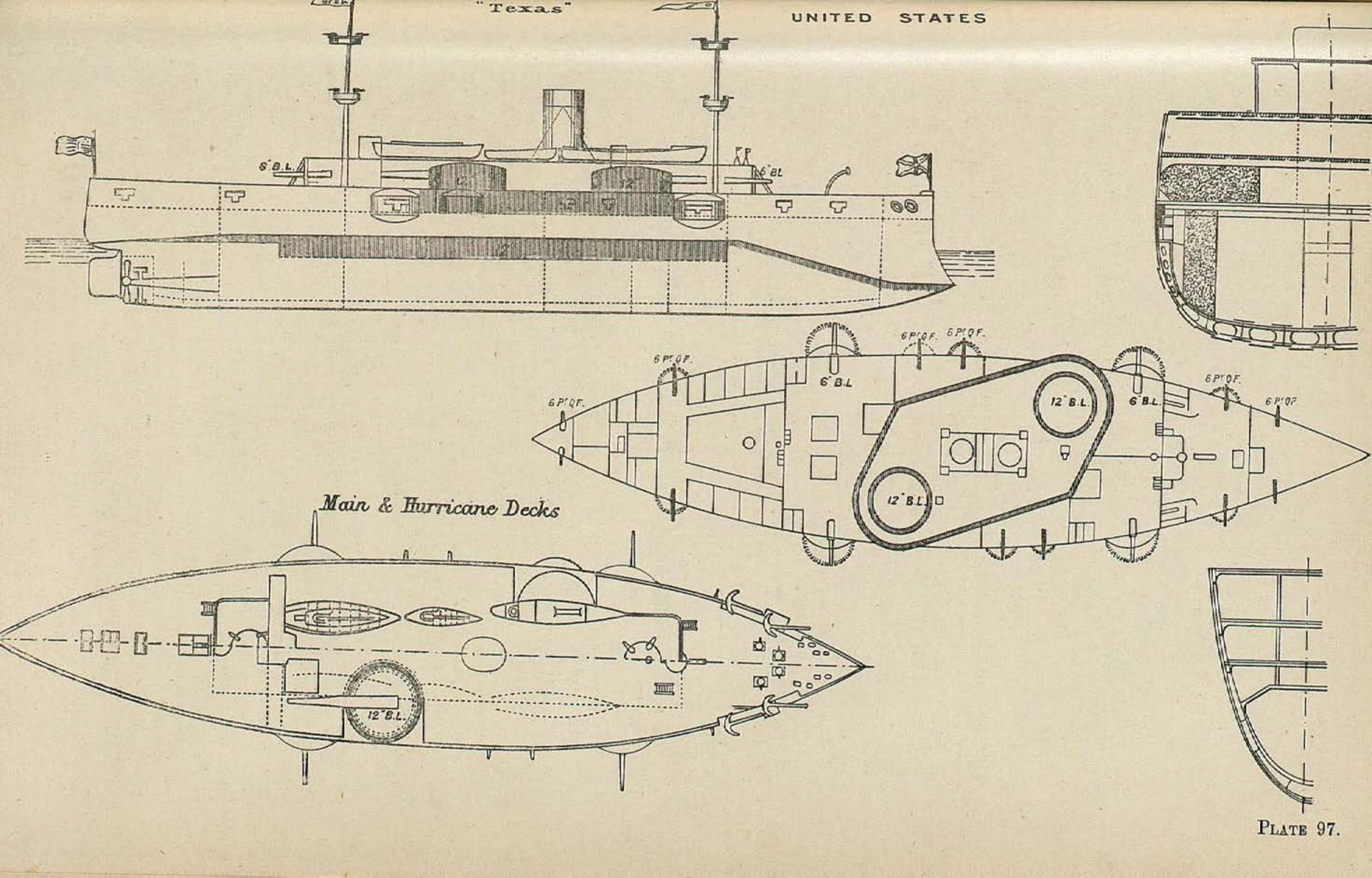


PLATE 97.

PART III.

ARMOUR AND ORDNANCE.

PART III.

Armour and Ordnance.

CHAPTER I.

Armour.

For many years past it has been supposed by some of our leading artillerists that the time would soon come when the power of the gun would drive ships' armour out of the field as surely as it had disposed of body armour. At present, however, far from that being the case, not only does armour maintain its place and importance with regard to line-of-battle ships, but the advocates of the cruiser have long ceased to put forward the type once contemplated in the so-called "mosquito" ships, but recommend instead a vessel with a large measure of protection provided in the form of deck armour, gun-shields, bulkheads, traverses or casemates, and in some cases even vertical armour belts. It follows, then, that armour absorbs so much attention, and so much science and manufacturing skill is devoted to its development, that the nation which is content to keep long in any one beaten track finds itself dropping behind other powers.

At the present time, special efforts are called for in this country. With our splendid establishments for manufacturing armour, and with our powers and energy called out by the needs of our great navy, it would naturally be expected that we should take the lead in armour. This, it is to be hoped, is generally the case. Nevertheless, the demand in other countries is sufficient to call out their best powers also, and the competition is so keen and unremitting that at any time a fresh advance may be made in one or another quarter which no great naval power can afford to treat with neglect. Thus the Harvey process received careful consideration, indeed it could not be safely ignored, and as a consequence it has either been

Authorities.—The *Engineer* for plates and matter; the United Service Institution Proceedings; the *Times*; Captain Jaques, Captain Tresidder, and Lieutenant Meigs; and direct communication with Herr Krupp, Messrs. Carnegie, and with Bethlehem and other manufacturing establishments.

adopted or some alternative system of treatment to give plates a hard face has come in nearly everywhere. The same attention should be given to other features of manufacture, such as "double-forging" and the use of nickel. Even the curious device of caps on shot was tested in most countries, though, as noticed hereafter, owing to its limited application, it may be questioned if it has been extensively taken up by any. It will be seen by the records of experiments given later on, that great results have been obtained by double-forged plates in America, and that any difficulties attending the use of nickel have been so far mastered, that plates containing it have exhibited a combination of hardness and toughness not hitherto attained by other means, especially in the case of thick armour.

This is seen in a remarkable way in the case of Krupp's plate, shown in figs. 8 and 9. The highest estimate that has been made until lately for the power of face-hardened plates to resist perforation is $1\frac{7}{8}$ that of wrought iron. That is to say, the face-hardened steel plate only yields to a shot which would perforate $1\frac{7}{8}$ times its thickness in wrought iron, and this standard has probably hitherto only been approached by thin plates, though in the case of Carnegie's reforged 6-in. plates the extraordinary figure of merit on this system of 2·5 has been exceeded this year.* This Krupp plate is 11·8 in. thick. The standard above indicated would involve its yielding to any shot capable of perforating 22 in. of iron. This plate, far from yielding to this, completely resisted a shot whose calculated perforation is about 25·9 in. of iron, or 2·19 times its own thickness. The projectiles broke, and this action is due to the hardness of its face. Still more remarkable, however, is its toughness or power to resist fracture or smashing. In recent trials, the attack being made by shot of small calibre in proportion to their energy, their total shock has been but small compared with their perforating power, so that it is seldom that a plate has been subjected to a single blow delivering 500 foot tons energy per ton of plate. Even when 6-in. plates have been attacked by 6-in. shot the area and weight of the plate have been large compared with the portion struck. In the case of thick plates, however, the area cannot be proportionately large, but is comparatively curtailed, and hence this Krupp plate was struck with blows of great crushing energy in proportion to the mass of the plate. It resisted without cracking the attack of 12-in. shot, though the heaviest blow involved a shock of 1,479 ft. tons per ton of plate. This implies extraordinary toughness, and must be attributed mainly to the skilful use of nickel, and the hope expressed

* That is to say, this armour completely defeated two blows, and that delivered by first-class shot. *See* p. 354.

in the last *Annual*, that England had not permanently abandoned the use of nickel, especially for thick armour, appears to be more than justified by this and other experiments. Happily, nickel plates and double forged plates have now been made experimentally at Brown's Atlas Works and possibly elsewhere in Sheffield, and it is to be hoped that England may produce plates which may again compete successfully with all comers. It would, perhaps, be hardly conceivable that in keen international competition some foreign plate should not occasionally beat us. Nevertheless, it would be foolish to shut our eyes to the fact that the neglect of nickel has been a mistake, as already urged, and we need to wake up in earnest in spite of any excellent results obtained without it.

On behalf of other makers, it is to be remarked that Krupp's plate was a "champion" in every sense of the word, that is, not a plate taken haphazard from a batch in course of supply to ships, but a plate made without regard to any exact shape, simply to resist attack. On this ground, however, it can well afford to take its stand. All our earliest face-hardened plates stood for a time on the same ground, and it was seriously questioned if they could be shaped according to the requirements of the service, nevertheless experience enabled this to be done successfully.

In projectiles also great strides have been made, especially in the United States. Latterly a 6-in. face-hardened plate has been expected to defeat the attack of 6-in. shot of high quality, say Holtzer's, which may be said to constitute the international standard. Nevertheless projectiles have been made by the Wheeler-Sterling Company which have passed unbroken through good face-hardened plates one calibre thick. Captain Jaques, on the occasion of a lecture delivered by him at our United Service Institution, presented to the Institution a 6-in. Wheeler-Sterling projectile which had passed unbroken through a 7-in. nickel steel unhardened plate. The suggestion has been made to fire this again in England in order to compare it with our own shot. Indeed, we can only compare our own armour with that made by foreign powers by attacking both with the same projectiles. Sometimes a foreign competitive plate trial supplies the necessary information, but it seems desirable to render ourselves independent of such uncertain assistance by purchasing foreign shot systematically for the trial of our plates and for comparison with our own shot. It may be safely said that any shot which comes near rivalling the achievements of the Wheeler-Sterling is a very excellent projectile.

Without direct comparison it would be wrong to say positively that in England or on the Continent as good, or even better, shot might not be produced, but Carpenter's shot are said to have been

beaten by the Wheeler-Sterling, and Carpenter's have behaved admirably in time past, comparing very favourably with Holtzer's. These last were long considered the best known, so that there is much to suggest that the United States have latterly succeeded in making extraordinary projectiles. Altogether it appears necessary that England should exert herself if she is to hold the place that she ought to maintain in the manufacture of both armour and projectiles.

Trials of thick Harveyed plates.

To come to particulars, the Harvey process has long proved itself to be remarkably successful when applied to armour plates of medium thickness. It was, however, questioned whether the carburizing action could be carried sufficiently deep to benefit very thick plates to the same extent as thin ones. It appeared likely, also, that when a very large mass of armour was exposed to a high temperature for many days, crystallization might take place to an injurious extent, and although double-forging might obviate or modify this last evil, the difficulties of the whole problem increase with the thickness of the plate, so that experiments given hereafter conducted in the United States with thick armour have a special interest. The usual test consists of one blow, which the plate must resist without cracking, and a second at a higher velocity, under which the plate may crack, but perforation causes the plate to be rejected.

Double forging.

Bethlehem plates.

Plate experiments carried out at Ochta, St. Petersburg, have the value attaching to international competitive trials, the armour being submitted from foreign countries. The following is the record of a Bethlehem plate, which took place on November 23rd and on December 5th last (see Figs. 1 and 2). The plate is not a "record breaker," nor is it double forged, but it must surely be pronounced to have behaved well. The fact is that it has not been tried at all as severely as is desirable to bring out special excellence. The plate was a Harveyed steel Bethlehem plate 12 ft. by 7½ ft. For a width of 4 ft. the thickness was 14½ in., for the last 3½ ft. it tapered down to 8 in., as shown in Fig. 2. The attack consisted of three rounds from a 9-in. gun firing projectiles weighing 446¾ Russian pounds, or 403·3 English pounds, and three rounds from a 6-in. gun firing projectiles weighing 96¾ lb. Russian, or 87·3 lb. English. The striking velocities and perforations are given in Table A.* It may be seen from this table that the perforating power was considerable, the maximum being 22·7 in. of iron or 18·1 in. of ordinary steel against this 14·5 in. face-hardened plate, and 14·8 in. of ordinary steel against a part which was about 11 in. thick. Six

* p. 348.

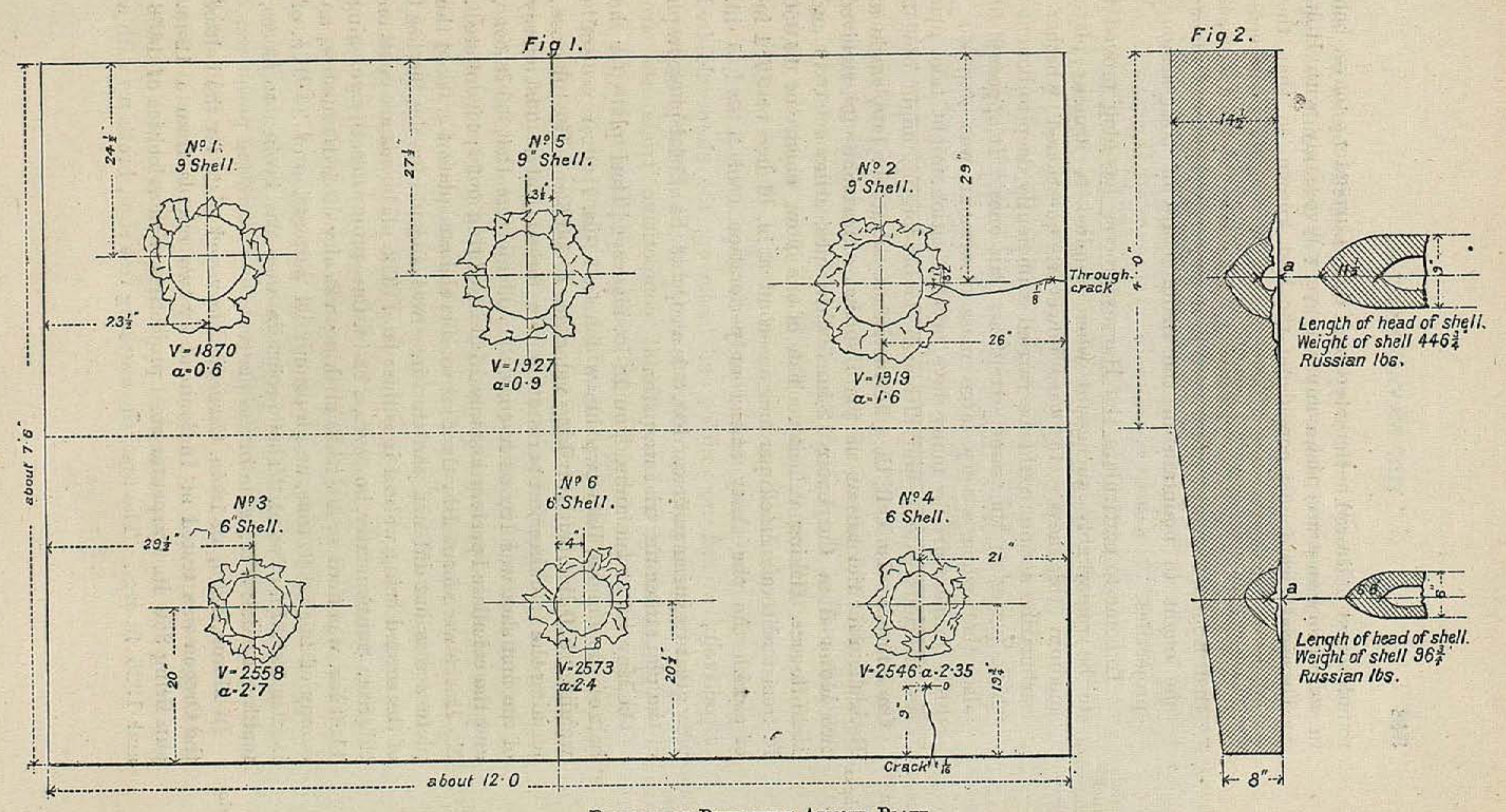


DIAGRAM OF BETHLEHEM ARMOUR PLATE.

rounds were delivered. In every case the projectile broke up, and in only two cases was there any crack. Yet this result has been far surpassed with double-forged plates.

TABLE A.

No. of round.	Calibre inches.	Weight of shot lb. English.	Striking velocity ft.-secs.	Striking energy ft.-tons.	Perforation by Krupp's formula.		Striking energy ft.-tons per ton of plate.
					Inches iron.	In. steel ordinary.	
1	9	403·3	1870	9777	21·7	17·3	475·6
2	9	403·3	1919	10290	22·5	18·0	500·8
3	6	87·3	2558	3961	18·3	14·6	192·7
4	6	87·3	2546	3922	18·1	14·5	190·8
5	9	403·3	1927	10390	22·7	18·1	505·3
6	6	87·3	2573	4007	18·4	14·8	194·9
							2060·1

Russian trial of Bethlehem plates.

On February 19th, 1895, a 15-in. Harveyed steel plate, made at Bethlehem for the turrets of the Indiana or Massachusetts, received two blows from Carpenter 10-in. 500 lb. projectiles at 1539 and 1940 ft.-secs. striking velocity. The last had an energy of 13,050 ft.-tons and a calculated perforation of 21·4 in. of iron or 17·1 in. of steel. As the shot entered only to depths of 3 and 5 in. respectively, caused no cracks, and broke up, the plate exhibited very great resisting powers. Fig. 3 is a copy of the official photograph of the plate after the trial was over.

On May 1st at Indianhead, an 18-in. Harveyed steel plate, for the belt of the Oregon, bore two blows from a 12-in. Holtzer projectile weighing 850 lbs., with striking velocities of 1465 and 1926 ft.-secs., forming the cracking and perforating tests respectively. The energy of the first shot was 12,662 ft.-tons, that of the second 21,885 ft.-tons, and the calculated perforation was 25·3 in. of iron or 20·2 in. of steel. No cracks were formed by the first round; the second shot cracked the plate across, but did not perforate it. Both shots broke up, the head of the second being welded into the plate. The plate was accepted on this test. Subsequently, however, a 13-in. Carpenter projectile weighing 1100 lbs. was fired at it with a striking velocity of 1810 ft.-secs., an energy of 25,000 ft. tons, and a calculated perforation of 24·9 in. of iron or 19·9 in. of steel. This projectile was also broken to pieces, making a crack 3 in. wide in the plate.

Carnegie plates.

In March, 1895, an 18-in. Carnegie Harveyed plate for the belt of the Oregon was tested at Indianhead by two rounds from a 12-in. gun firing 850 lb. Carpenter steel projectiles with velocities of 1458 and 1925 ft.-secs. The first, the cracking test shot, broke up with a



Fig. 3.—Bethlehem Barbette Plate.

penetration of about 5 in. and no cracking. The second penetrated 7 in., the head lodging and welding itself to the plate, and the body rebounding; the plate was cracked across.

A 14-in. Harveyed Carnegie plate was attacked by 10-in. 500-lb. projectiles with velocities of 1859 and 1940 ft.-secs., which failed even to crack it. A 12-in. shell with 1858 ft.-secs. striking velocity perforated it, but without fracturing it. This is the test laid down for 17 in. of armour, the calculated perforation being about 24·4 in. of iron, or 19·5 of ordinary steel.

Russian Trial of Carnegie double-forged plate.

The photograph reproduced herewith shows the results of a trial of a Carnegie double-forged nickel steel Harveyed plate, tested at Ochta, near St. Petersburg, towards the end of last year. The plate measured 8 ft. by 8 ft. by 10 in. Fig. 4 shows the plate after attack. The details of the trial are shown in the following table:—

Round.	Projectile.		Striking velocity.	Striking energy.	Calculated penetration through iron.	Estimated actual penetration.
	Diameter.	Weight.				
	inches.	lb.	f.s.	ft.-tons.	inches.	inches.
1	6	88	2589	4090	19·2	7·9
2	6	88	2597	4116	19·3	8·5
3	6	87·35	2891	5063	22·5	10·2
4	9	402·7	1879	9856	20·6	11·75

The projectiles are all of Poutiloff make. The three first struck at $1\frac{1}{2}$ degrees to the normal to the plate face and the last at 3 degrees. It may be observed that the first three rounds produced no cracks, and were, in fact, wholly defeated. Their calculated perforations were greatly in excess of what would have been expected that any 10-in. plate could resist until recently. Dividing the calculated perforations, which are worked by Tresidder's formula, by the plate thickness, the figures obtained are: 1·92, 1·93, 2·25 and 2·06, implying that the plate resisted blows capable of perforating 1·9 to 2·1 times its thickness of wrought iron. It is difficult to give it its exact figure of merit in perforation, seeing that it was not completely perforated; also the last round got deeper in than that preceding it, although its calculated perforation was less, showing that the defeat was due, as we know, to the fracture of the shot, and that the larger shot held more stoutly together, and so delivered more of its energy in the work of perforation than the smaller ones. One interesting feature is the extremely high velocities employed. This is the first recorded armour plate attack with velocities exceeding 2500 ft.-secs.

The third round, it will be seen, struck with a velocity of 2891 ft.-secs. This being so, it is instructive to note that the projectiles did not deliver an overpowering amount of their energy before they broke. Judging from one previous plate trial, it might have been thought

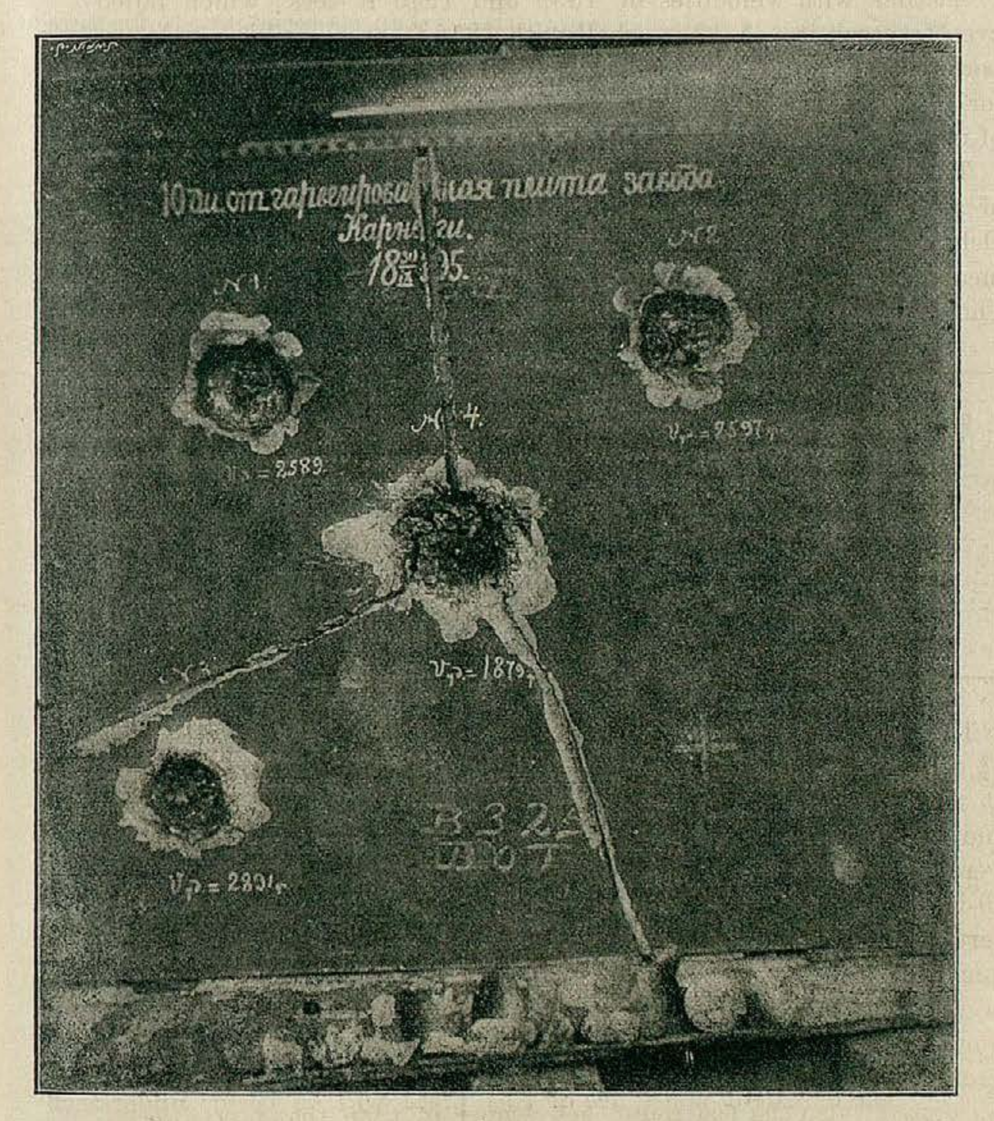


Fig. 4.—Carnegie Double-Forged Plate.

likely that the 9-in. shot striking with its very high velocity would have done more justice to its theoretical power of penetration than the 9-in. striking at 1000 ft.-secs. lower velocity. This was not the case. The projectiles, however, did get deeper than is usual for shot that

are completely defeated. Was this due to their high velocity or to their high quality? Such questions cannot be answered until we all purchase each other's projectiles, and so compare their respective powers, or test them by some standard shot. The plate, it is needless to remark, is a first-rate one judged by any standard, but resistance to perforation is certainly more striking than its resistance to fracture. It will be seen that the smashing blow obtained by dividing the striking energy of the third blow by the probable weight of the plate, probably about 11·72 tons, amounts to 432 ft.-tns. per ton of the plate. This the plate resisted. That of the last blow is 841 ft.-tns. per ton of plate nearly. Under this the plate broke, the shot being, however, fractured and kept from perforating.

On September 4th, 1895, a 14-in. Carnegie reforged Harvey plate (see Fig. 5) was struck by 10-in. 500-lb. Carpenter projectiles with velocities of 1482 and 1856 ft.-secs.; both shells broke up, leaving the heads embedded, the first entering about 3½ in., the second about 9 in.; no cracks were formed. The calculated perforation for this last is about 20·4 in. of iron or 16·3 of steel. The plate had thus passed the service trial with a large margin to spare. To test further its powers of resistance, a 12-in. Wheeler-Sterling projectile weighing 850 lbs. was fired with a striking velocity of 1800 ft.-secs. The point of this shell got through to the back and cracked the plate across, the shell itself breaking off below the head. On this trial Captain Jaques remarks as follows:—

"As the contract velocity for the second shot against a 17-in. Harvey plate is 1858 ft.-secs., and as the additional 58 ft. would not have caused this shell, although a very good one, to have perforated the plate and backing, it appears that this plate, after having stood the test of a 14-in. plate, has passed the test of a 17-in. plate. This is a better record than any other thick plate heretofore tested.

"A fourth round was fired at this plate later, the point of impact being taken on the right-hand portion. A Wheeler-Sterling 13-in. armour piercing shell weighing 1100 lbs. was fired with a striking velocity of 1800 ft.-secs. The shell perforated the plate, backing, and structure, and was recovered unbroken. The plate was cracked comparatively little.

"The excellent resistance of this plate will be better understood if we recall that the second, or higher velocity shot, for an 18-in. Harvey plate, with a 13-in. gun, requires a velocity of 1810 ft.-secs. These tests justify the conclusion that the forging after carburization, as practised by the Carnegie Company, benefits very materially the body of the plate, while at the same time it does not appear to impair the efficiency of the carbonised surface."

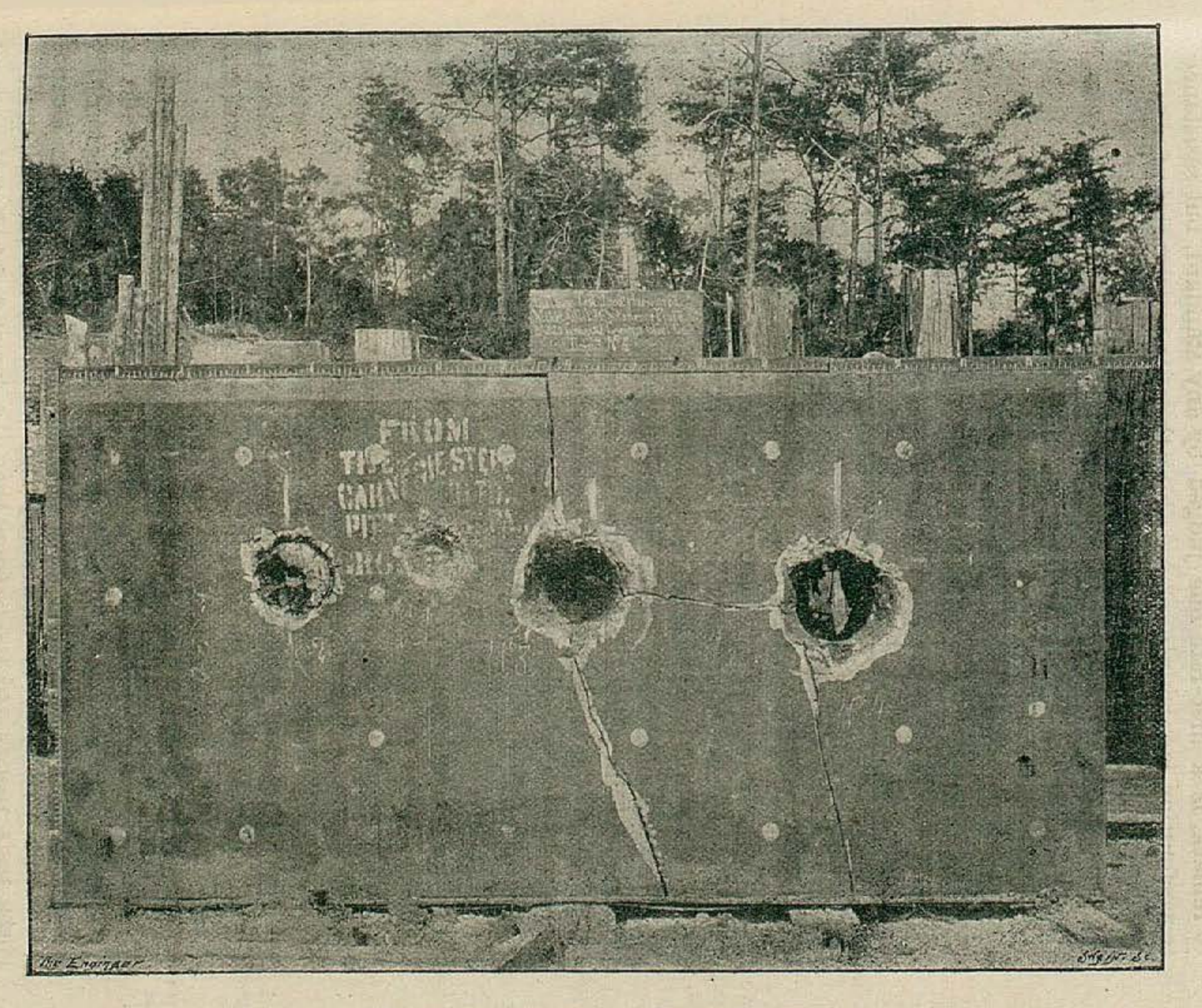


FIG. 5.—CARNEGIE DOUBLE FORGED PLATE.

That Captain Jaques' remarks are justified the following figures will show. The calculated perforations through iron due to each of these rounds are shown in the table below :—

Round.	Projectile.		Striking velocity.	Perforation.		
				Iron.		Steel.
	Calibre.	Weight.		Maitland or Fairbairn.	Tresidder.	Tresidder.
	ins.	lbs.	ft.-secs.	ins.	ins.	ins.
1	10	500	1482	16·0	15·4	12·3
2	10	500	1856	20·4	21·6	17·3
3	12	850	1800	23·5	24·4	19·5
4	13	1100	1800	25·8	26·7	21·4

This 14-in. plate then defeated, without cracking, two projectiles, the calculated perforation of the second being 17·3 in. of steel untreated. Its equivalent in wrought iron is 21·6. It kept out the third, but broke under it with 19·5 in. calculated perforation of steel. The last round out-matched it.

In the summer of 1895, at Indianhead, a reforged Harveyed Carnegie 6-in. plate (that is an 8-in. reduced by re-forging to 6-in. thickness) was attacked by a 6-in. gun, firing Wheeler, Sterling and Carpenter projectiles, striking with a velocity of 2100 ft.-secs. ; one shot of each make welded its head in the plate, cracking the plate slightly. The projectiles were thus defeated by a plate one calibre thick. Their calculated perforation is 14·9 in. of iron or 2·5 times the thickness of this plate. This figure of merit is extraordinary, and the more so because it was obtained when Wheeler Sterling and Carpenter shot were employed.

U. S. semi-armour piercers. Some Sterling armour-piercing shells, termed "semi-armour-piercing," were tested during the summer. They are expected to perforate a Harveyed plate equal to two-thirds of their calibre without exploding the bursting charge.

Krupp's armour trials. An extract of a paper in *Stahl und Eisen*, by J. Castner, September 15th, 1895, is published in a pamphlet with prints of photographs of results obtained by Krupp's armour within the year. In answer to a request, large photographs have been also furnished by Herr Krupp. In this pamphlet is mentioned the fact that all nations, except England, have pushed on with the manufacture of nickel steel armour. Success was obtained with nickel and chromium by St. Chamond, but nickel only was adopted by the United States. Difficulties of blow-holes and blisters are referred to, but these, while they interfered

but little with the actual strength of the armour, have been in a great measure got over, and armour-plates have been turned out by Messrs. Krupp free from them. Captain Sampson's opinion is quoted as to the beneficial effect of nickel, both in increasing the depth of the carburizing action and in giving security in the final water hardening. The difficulties and disappointments at first experienced with thick plates are referred to. These have been at length overcome, but it has been found that metal for treated and water-hardened faced armour must be more carefully selected than for that which is for oil tempering. There is a liability during cementation to the formation of blisters and flaws, which may be developed seriously in subsequent forging. Thick treated plates, however, have been at length successfully produced on both sides of the ocean with care and experience. It has been found important to prevent the production of gas arising from the action of carbon on an oxide film on the metal; also rapid carburization has been found to destroy the fine grain in the metal and to produce large crystals like those in cast iron. Instead of wood charcoal, animal charcoal has been used in America, the surface of the plate being covered with it to a depth of from (·48 in. to nearly ·6 in.) over which is laid the usual charcoal mixture. The Grambow process is also mentioned, and the Creusot process of carburizing by means of ordinary illuminating gas. The results obtained by the Creusot process have not been published, and Captain Jaques, the writer observes, guesses that Krupp uses a similar process; but how far this guess is correct is not stated. Gas is, however, said to offer the following advantages over charcoal in any solid form:—First, its action is more even, and gives greater uniformity; secondly, it is more certain or sure; thirdly, its action extends deeper; fourthly, it takes a shorter time; fifthly, it does not need so high a temperature. Consequently, it improves the quality of the plate and saves expense.

The hardening action has been at length successfully graduated into the tough foundation, so as to avoid the danger of producing a hard layer which would scale off, and the depth of metal rendered too hard to drill has been brought to from 20 mm. to 30 mm. (·79 in. to 1·18 in.). The trials following took place on December 15th and 17th, 1894, and on March 15th and 16th, 1895, in the presence of representatives of the German navy.

Figs. 6, 7 and 1B show the effect of an experiment made to ascertain whether a number of hair furrows or surface cracks—twenty-six in all—developed in a 146 mm. (5·75-in.) plate in manufacture, acted injuriously on the plate under trial. The plate, No. 413 II., was 2·73 m. by 1·5 m. (8 ft. 11·1 in. by 4 ft. 11 in.)

treated Krupp nickel steel plate. It weighed 4,580 kilos ($4\frac{1}{2}$ tons), and was held up by ten 65 mm. (2·6-in.) bolts. The following rounds were fired at it, with armour-piercing steel projectiles :—

No. of round.	Calibre in		Weight of projectile.	Striking velocity.	Calculated perforation through iron.	
					Fairbairn or Maitland.	Tresidd r.
	c.m.	in.	lb.	f.s.	in.	in.
I. . . .	15	5 9	112·4	1560	10·4	10·2
II. . . .	15	5·9	112·4	1891	12·8	13·6
III. . .	15	5·9	112·4	1734	11·7	11·8
IV. . .	21	8·27	209·4	1431	10·9	10·3
V. . . .	21	8·27	209·4	1641	12·7	12·6

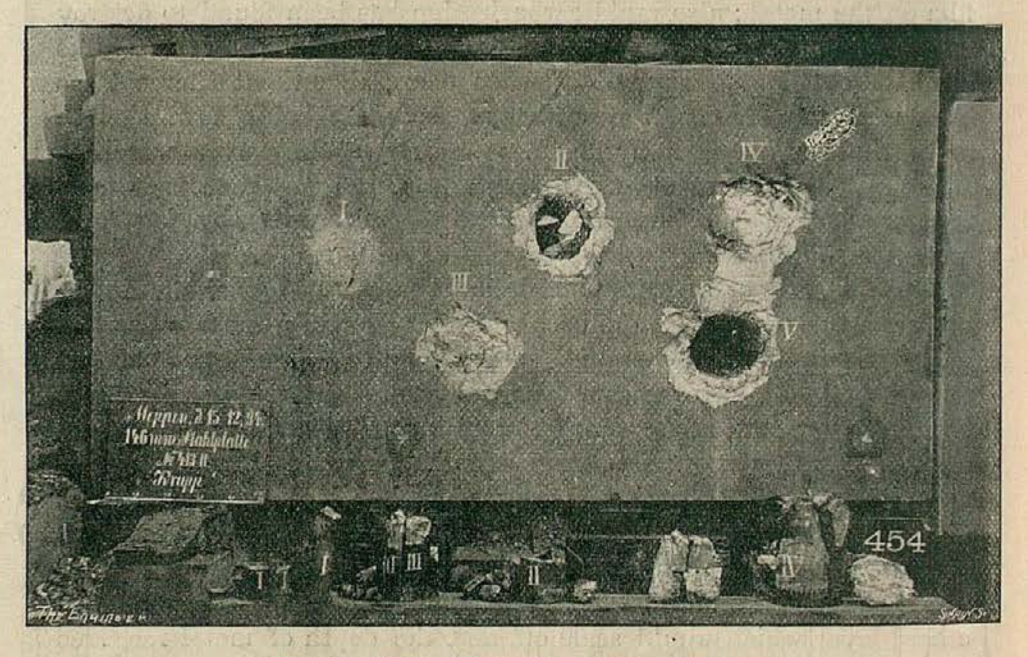


FIG. 6.—KRUPP HARD FACED NICKEL STEEL.

It will be seen by Figs. 6 and 7 that only Rounds II. and V. perforated. The shot most nearly matching the plate is No. III., and the resistance is very good. The actual equivalent of wrought iron suggested above is $1\frac{7}{8}$ in. the thickness of the face-hardened steel, so that we may consider a face-hardened plate which is equal to double its thickness of wrought iron a good one. In this case, then, the plate would be good if it was equal to 11·5 in. of wrought iron. That it

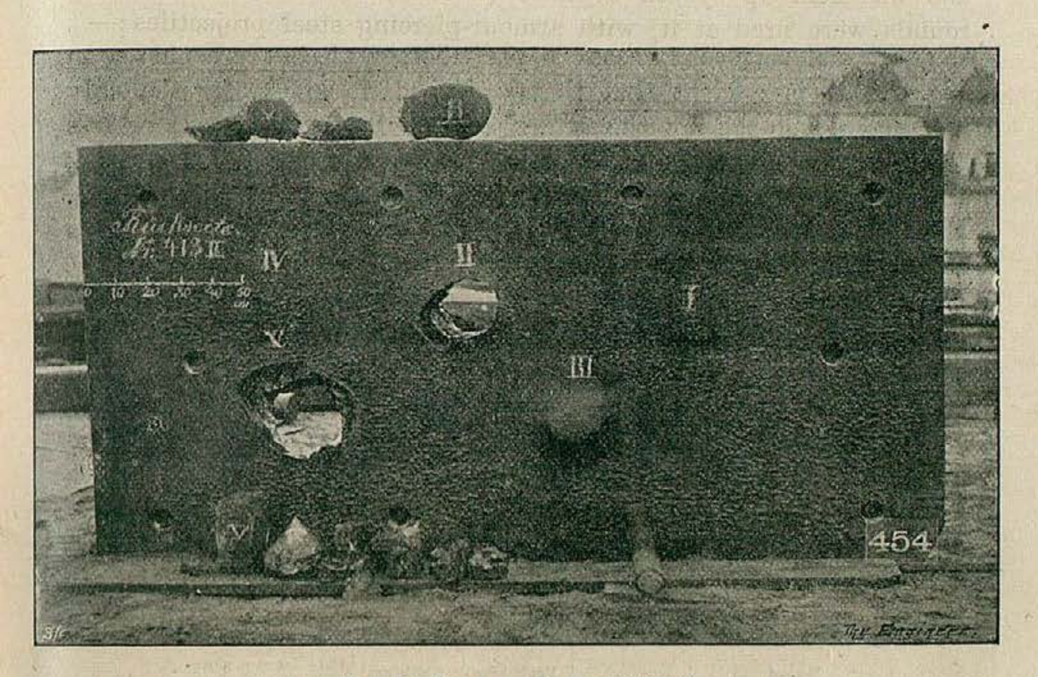


FIG. 7.—BACK OF PLATE. FIG. 6.

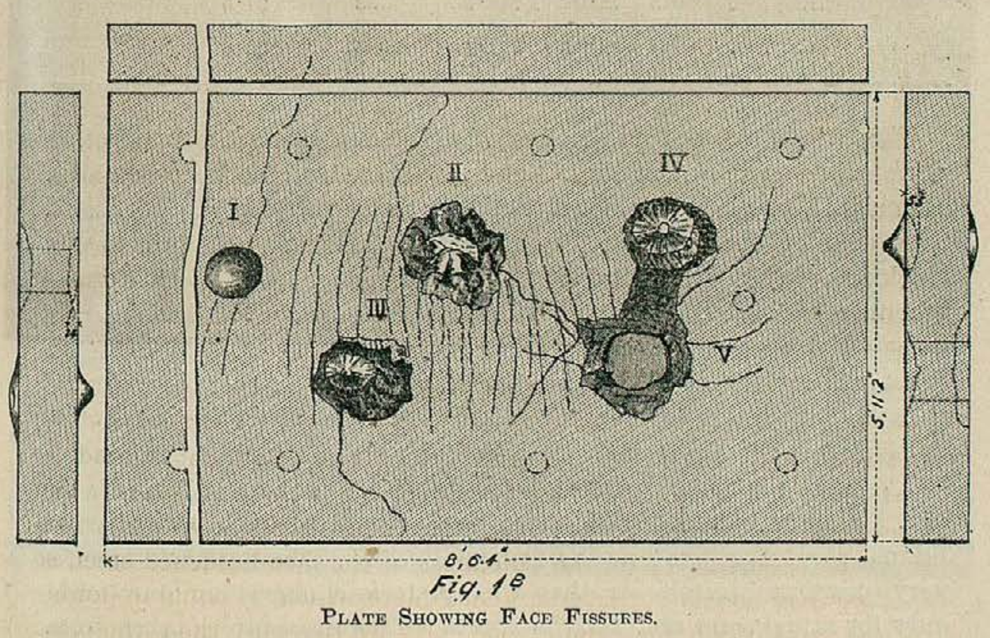


Fig. 18

PLATE SHOWING FACE FISSURES.

resists the passage of a projectile of 11·8 in. calculated perforation, or 2·5 times its thickness, shows that it possesses remarkable excellence. The fissures ran down the face in nearly parallel lines; they are not very easily seen in the photograph, but are shown in Fig. 7. It is evident that they produced no effect, for the only cracking developed by the attack consisted in a few more or less radial cracks from Round V., and one or two others from III., II., and I.—see Fig. 1B. Space forbids giving effects in more detail. Fig. 6 shows the back with a bulge partly opened at III., clean holes at II. and V., and bulges at I. and IV.

Another plate, 5·75 in. thick, gave a still better result, a 21 c.m. (8·27 in.) shot with 13·5 in. calculated perforation through iron breaking up without getting through. The total energy of this round was 7424 ft.-tons, or 1584 ft.-tons per ton of plate.

Space forbids the notice of other good plates, but attention is called to the most remarkable plate of the series, No. 432 U (see Figs. 8 and 9). Its dimensions were 3·0 m. (9 ft. 10·1 in.) × 1·90 m. (6 ft. 2·8 in.) × 300 mm. (11·81 in.); it weighed 13·27 tons. The following rounds were fired at it:—

No. of round.	Calibre in		Projectile weight.	Striking velocity.	Calculated perforation through iron by Tresidder.
	c.m.	in.	lb.	f.s.	in.
I. . .	30·5	12·01	716·1	1753	21·5
II. . .	30·5	12·01	715·4	1889	23·9
III. . .	30·5	12·01	712·7	1993	25·9

The whole of the projectiles were broken up without effecting perforation, as shown in Figs. 8 and 9. There were no serious cracks. Round III. was a tremendous test, both as to perforation and shock. The rate of the calculated perforation, 25·9 in., of iron to the thickness of the plate, is 2·19. The striking energy—19,630 ft.-tons—amounts to 1479 ft.-tons per ton of plate. The plate has entirely defeated the attack, and may be fairly claimed as exhibiting an extraordinary union of hardness and toughness. It may be objected that the projectiles are perhaps inferior to those used in the States or elsewhere; but very inferior indeed would these projectiles have to be to make the plate before us anything but a very extraordinary one. A more reasonable objection, and one that ought in justice to be made—and to give him his due, the writer of the report raises the very question himself—is that this plate is a champion one, made only for attack, and not, like the American plates, samples taken from a supply for ships. The gist of this objection lies in the fact that the

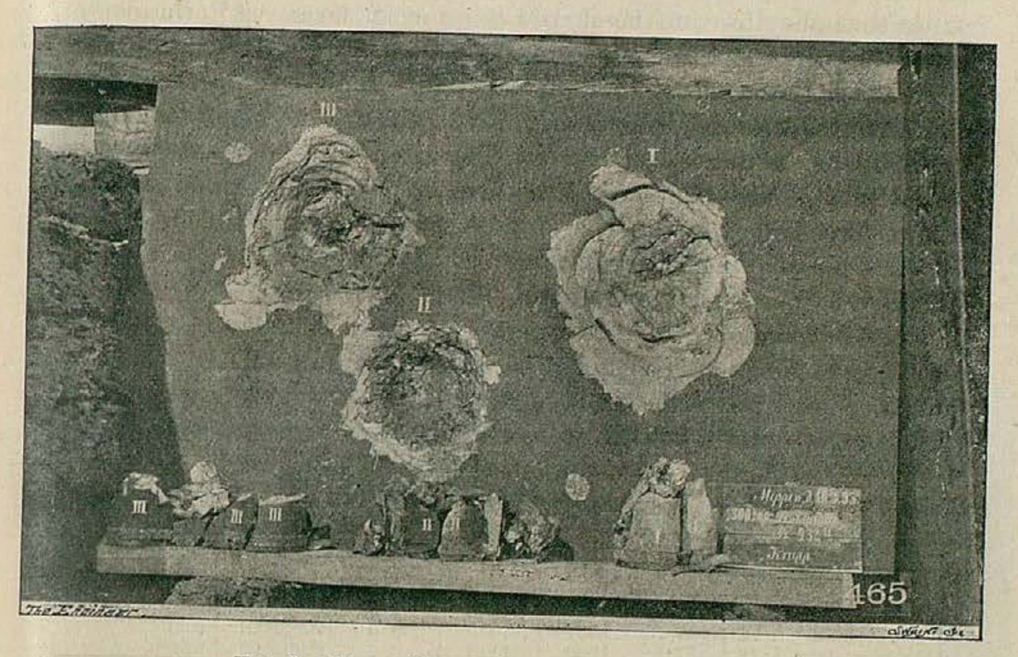


FIG. 8.—KRUPP NICKEL STEEL HARDENED PLATE.

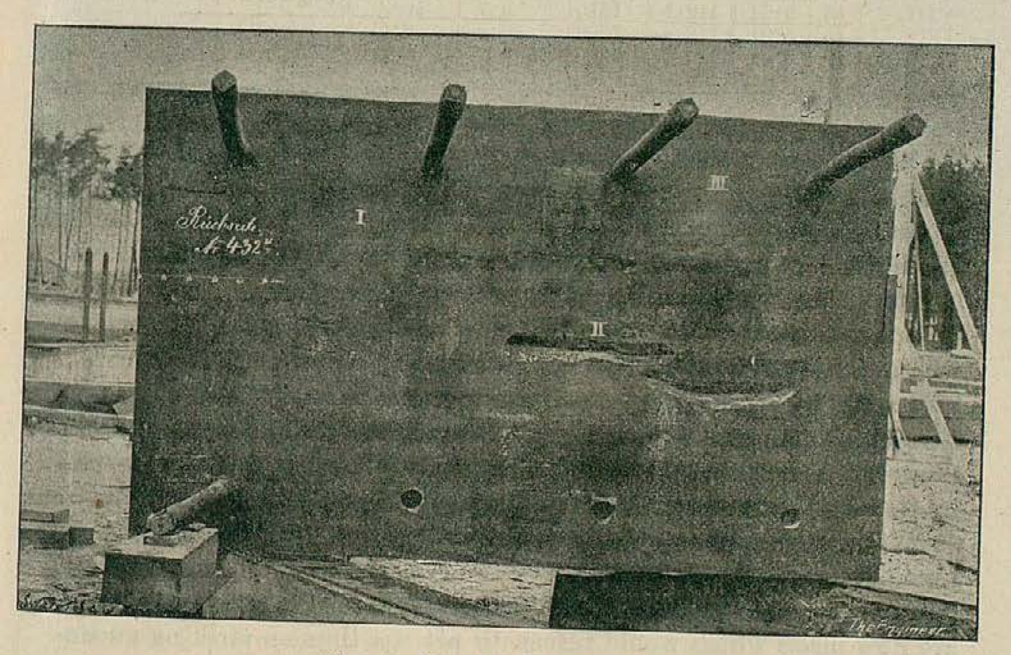


FIG. 9.—BACK OF PLATE. FIG. 8.

treatment of ships' plates must necessarily be hampered by the circumstance that they have to be shaped to an exact form. Allowance on this score may be freely conceded. The plate may very well take its stand on its merits as a champion plate. It is added in the report that the excellent plate with treated and hardened face exhibited by Krupp at Chicago was produced by metallurgical means which could be applied to a plate which was required to be brought to any desired form.

The last plate whose trial is reported (see Fig. 10) is of a totally different character, being an unhardened nickel plate 8 ft. 6·4 in. by 5ft. 11·3 in. by 6·10 in., weighing 5 tons 6·1 cwt. This was subjected to an attack shown in the following table:—

No. of round.	Calibre in		Weight of projectile.	Striking velocity.	Calculated perforation through iron by Tresidder.	Penetration achieved.	Effect.
	c.m.	in.	lb.	f.s.	in.	in.	
I. . .	12	4·72	57·32	1641	8 8	7·0	Projectile set up 0·35 in.
II. . .	12	4·72	57·32	1690	9·2	7 2	Projectile set up 0·43 in.
III. .	12	4·72	57·32	1894	10·9	9·6	Projectile broken.
IV. .	12	4·72	57·32	1950	11·4	9·4	Projectile broken.
V. . .	17	6·69	169·8	1408	10·5	Through	Projectile set up 0·08 in.
VI.. .	12	4·72	57·3	2148	13·1	Through	Shot broken.
VII. .	15	5·91	112·4	1338	8·1	6·7	Projectiles unbroken but set up, amounts not exceeding 0·81 in.
VIII. .	15	5·91	112·4	1516	9·7	10·8	
IX. .	15	5·91	112·4	1566	10·2	9·5	
X. . .	15	5·91	112 4	1636	10·9	Through	

This plate had thus borne, it is observed, blows whose total striking energy amounted to 5,109·9 m.t. (16,500 ft.-tons). The report concludes by observing that this plate showed striking qualities, having great toughness, combined with an amount of hardness which offered great resistance to penetration.

This verdict is well supported. It will be seen that projectiles whose calculated power of perforation was over 10 in. of wrought iron or 8 in. of ordinary steel, and in one case 11·4 in. of iron or 9·1 in. of steel, and which should, therefore, have easily perforated this unhardened plate, whose thickness was only 6·1 in., were stopped by it, although they got their points through. It will be observed that the three projectiles fired with a velocity of 1,894 ft.-secs. or over broke up, while the whole of the remainder set up more or less, the extreme limit being 0·81 in. in length. Probably projectiles are now made which would refuse to set up thus on striking an unhardened plate with a velocity of from 1,340 ft.-secs. to 1,650 ft.-secs., but to establish this they need to be fired against the plates in

question. Be this as it may, this plate appears to be the *beau ideal* of what is required for inland shields, which are intended to resist the prolonged breaching attack of siege guns of medium power; and certainly if plates approaching the standard of the previous plates can be placed on ships' sides, the German naval officers may indeed congratulate themselves on the excellence of their armour.

Caps on points of armour-piercing shot.

The question of the use of wrought iron or steel caps on the points of armour-piercing projectiles remains nearly as it stood at the commencement of the year, that is to say, it has been

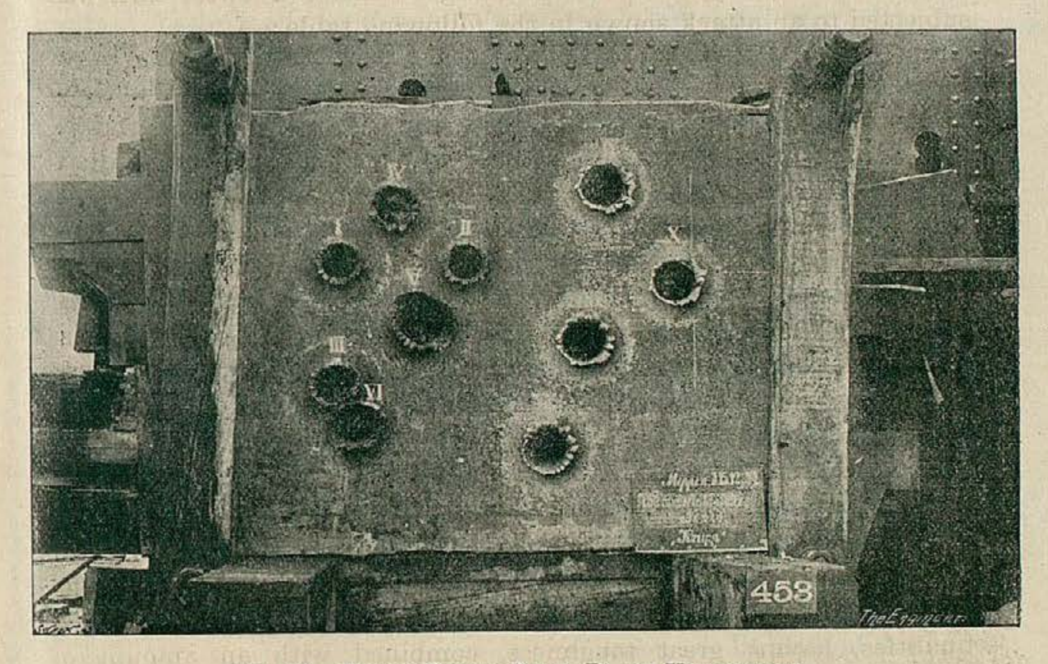


Fig. 10.—Krupp Nickel Steel Plate Unhardened.

proved that the use of such caps causes projectiles to perforate plates with treated faces in a remarkable way, striking normally or within 20° of the normal direction. As, however, this angle is less than two points of the compass, it is very doubtful if it could be often realized on service. Moreover, but few ships will possess treated plates for some years to come, so that the question appears to have been allowed to drop, though it could at any time be revived, the application of caps to existing projectiles being speedily effected.

Ackerman's treatment.

Lieut. Ackerman, U.S. Navy, has advocated a system of nicking or grooving the face of armour plates, by which means he expects

to facilitate the carburizing treatment, and also cause shot to be broken up on impact. One or two trials have been made, but not of sufficiently decided character to settle the question. The plate, however, does not appear to break up as might be expected. The fact is that, unless the carburizing process itself causes evil molecular action in the grooved surface, the grooves thus purposely made might have little tendency to encourage fracture, as it has been shown that a fissure or groove produced by external agency is a totally different thing from an incipient crack or flaw.

Armour-piercing projectiles. A great advance in the manufacture of armour-piercing steel projectiles has been made, as before noticed, in the United States during the past year. Excellent as the Carpenter projectiles have shown themselves to be, Captain Jaques reports that the Wheeler-Sterling have exhibited perforating power with greater uniformity. The pass test for armour-piercing projectiles in the United States is that they shall perforate unbroken an ordinary nickel steel plate 1⅓ calibres thick. In England the projectile must perforate 1½ calibres thickness of compound armour, but it is not rejected if it breaks up so long as all the shot fragments are carried through the plate. The success in the United States with the larger calibres of projectiles are especially to be noted. The following results were obtained with Wheeler-Sterling projectiles against nickel Harveyed plates in 1894 and 1895.

On July 12, 1894, a 12-in. projectile, weighing 850 lbs., perforated a 17-in. plate and 18-in. oak backing, with 1,858 ft.-secs. striking velocity, and was recovered only slightly injured.

On February 24, 1895, a 12-in. projectile, with weight and velocity as above, perforated a 14-in. plate and was recovered whole, except one inch broken off the point.

On June 15, 1895, a 4-in. shot, weighing 33 lbs., with a striking velocity of 2,000 ft.-secs., penetrated 9 in. past the face of a 5½-in. plate uninjured.

Capt. Jacques presented the United Service Institution a Wheeler-Sterling 6-in. shot that had perforated a 7-in. nickel plate, with 1700 f.s. velocity, remaining apparently uninjured.

In England, Colonel Bainbridge has recently succeeded in making a 6-in, shot in the Royal Laboratory, which has passed through 9 in. of steel without either breaking or setting up sensibly.

Tresidder's formula for perforation. Captain Tresidder, who specially feels the need of some international system of comparing armour, has this year proposed a formula for calculating perforation, which he advocates as theoretically sound. It would not be possible to discuss this claim here; it may, however,

be conceded without hesitation that his formula has the advantage of simplicity, and Captain Tresidder has embodied it in a slide rule which enables it to be used with ease and speed. Although in Krupp's formula, weight tells rather more than in that of Tresidder, the results are generally practically the same. The calculation of perforation at high velocities must necessarily remain in a very unsatisfactory condition until systematic experiments are made. The following table shows the perforations calculated on five systems for the heavier Canet guns on the new table furnished by him. It will be seen that while De Marre gives higher results, those of Krupp and Tresidder differ very little from them, while those of Fairbairn and Maitland, which are almost identical, are very much smaller. So far as experiments have been made, it appears that for high velocities the formulæ of Maitland and Fairbairn are wrong, and should on no account be used for velocities exceeding 2,000 ft.-secs. It would be desirable to adopt that of Krupp or Tresidder for all velocities over 1,580, the point where all agree fairly well, but it is undesirable to make small corrections in existing tables until they are established by experiment. At present the old formulæ of Fairbairn and Maitland are well proved for low velocities, while for high ones they are so grossly wrong that a correction must be applied: for intermediate ones it is well to wait at present.

Captain Tresidder's formula may be expressed as follows:—

$$t^2 = \frac{wv^3}{d} \times \frac{1}{\log^{-1} 8{\cdot}8410}$$

Where t = the thickness of wrought iron perforated in inches
w = weight of shot in lbs.
v = Striking velocity in ft.-secs.
d = the calibre or diameter of shot in inches.

Capt. Tresidder has also for some time past advocated the system of comparing plates with each other by the equivalent resistance in wrought iron used above. That is to say, the "figure of merit" of a plate would be its relation to wrought iron of equal resistance to perforation, and this would be expressed by dividing the equivalent thickness of wrought iron by the thickness of the plate. Thus, a 6-in. plate, which is just a match for a shot calculated to perforate 12 in. of iron, would have a figure of merit of 2; if its equivalent is 9 in. of iron its figure is 1·5, and so on. This in theory would supply a standard for plates irrespective of the scale on which it is employed; but, as Captain Tresidder points out, it is harder to attain any given figure of merit in proportion as the thickness of plate increases.

Figure of merit for perforation.

The following table gives a comparison of proportions obtained by various formula for high velocities:—

Calibre in c.m.	Calibre in ins.	Weight. lbs.	Velocity. f.s.	Calculated perforation through iron in ins. on system of De Marre.	Krupp.	Tresidder.	Fairbairn.	Maitland.
			2493	30·3	27·1	27·8	23·0	23·0
24	9·45	330·7	2626	33·8	29·5	30·1	24·2	24·3
			2756	35·4	31·4	32·3	25·4	25·3
			2493	26·0	25·4	25·5	21·0	21·0
21	8·27	242·5	2625	28·1	27·2	27·4	22·1	22·2
			2756	30·2	30·2	29·6	23·3	23·4
			2625	21·1	20·0	20·4	16·4	16·4
16	6·30	101·4	2756	22·8	21·5	21·9	17·2	17·1
			2953	25·3	23·9	24·4	18·5	18·7
			2625	20·4	19·5	19·7	15·8	15·8
15	5·91	88·2	2756	22·0	21·0	21·2	16·6	16·7
			2953	24·5	23·3	23·5	17·8	17·9
			2625	18·7	18·0	18·1	14·6	14·8
14	5·51	70 5	2756	20·1	19·4	19·6	15·4	15·5
			2958	22·3	21·5	21·7	16·5	16·6
			2625	16·1	15·9	15·9	12·8	12·9
12	4·72	46·3	2756	17·4	17·1	17·1	13·5	13·6
			2953	19·3	19·0	19·1	14·4	14·5
			3281	22·6	22·3	22·4	16·0	16·2

Corn Pith Cellulose for Warships.

Five years ago the question of packing the sides of warships with raft material was prominent, that is to say, the system of filling spaces with very light material, which would preserve floating power, inasmuch as there was no hollow space left which could be filled by water. Curious substances for this purpose have been resorted to. The one best known in this country was "woodite," called after Mrs. Wood, its inventor. This took two forms, buoyant woodite nearly resembling cork, and acting in the same way; and elastic woodite, consisting chiefly of india-rubber, intended to be used behind thin steel—for example in torpedo boats, and possessing the property of closing up after the passage of a projectile through it.

The United States *Engineering News* reports that corn pith subjected to a process perfected by Mr. Mark Marden has recently given capital results, acting in both ways to a certain extent, its weight when pressed as used being 6·5 lb. per cubic ft. This was compared with cocoa fibre cellulose weighing 7·7 lb. per cubic ft. The trial took place on June 10th last in the presence of Secretary Herbert. Two steel coffer-dams 6 ft. by 6 ft. by 3 ft. were used, the front plating was $\frac{3}{8}$ in., and the back $\frac{3}{16}$ in. thick. See Fig. 11. One was fitted with cocoa cellulose and the other with corn pith cellulose pressed in

tight by screw jacks. A 6-in. shot weighing 100 lb. was then fired through both, with a velocity of 1000 ft.-secs., after which each material appeared to close up the hole, water was then brought up over the holes. In about $10\frac{1}{4}$ minutes a drop of water found its way through the cocoa, and the water then flowed at the rate of nearly half a gallon per minute. The corn pith was subjected to the action of water rising to the top of the dam, perhaps 5 ft. above the hole, for $1\frac{1}{2}$ hours; no water, however, made its way through.

An 8-in. shot weighing 250 lb. was next fired through each coffer-

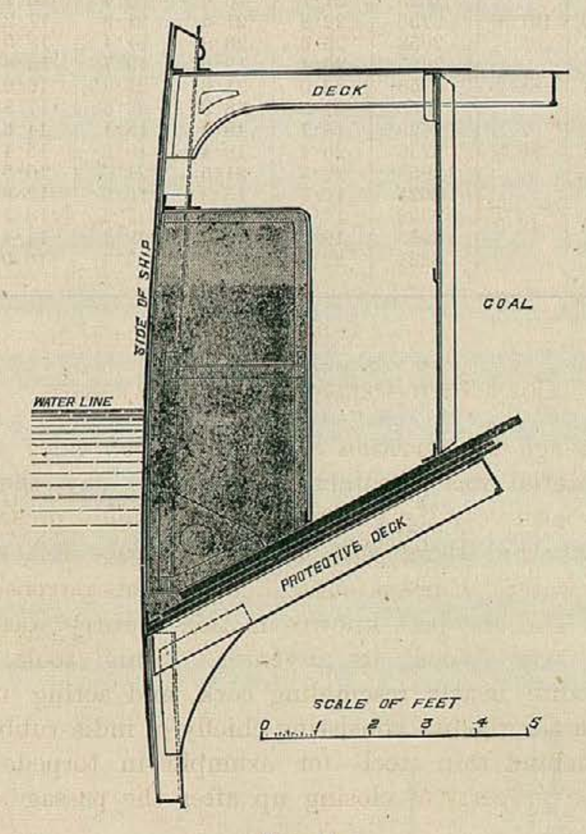


FIG. 11.

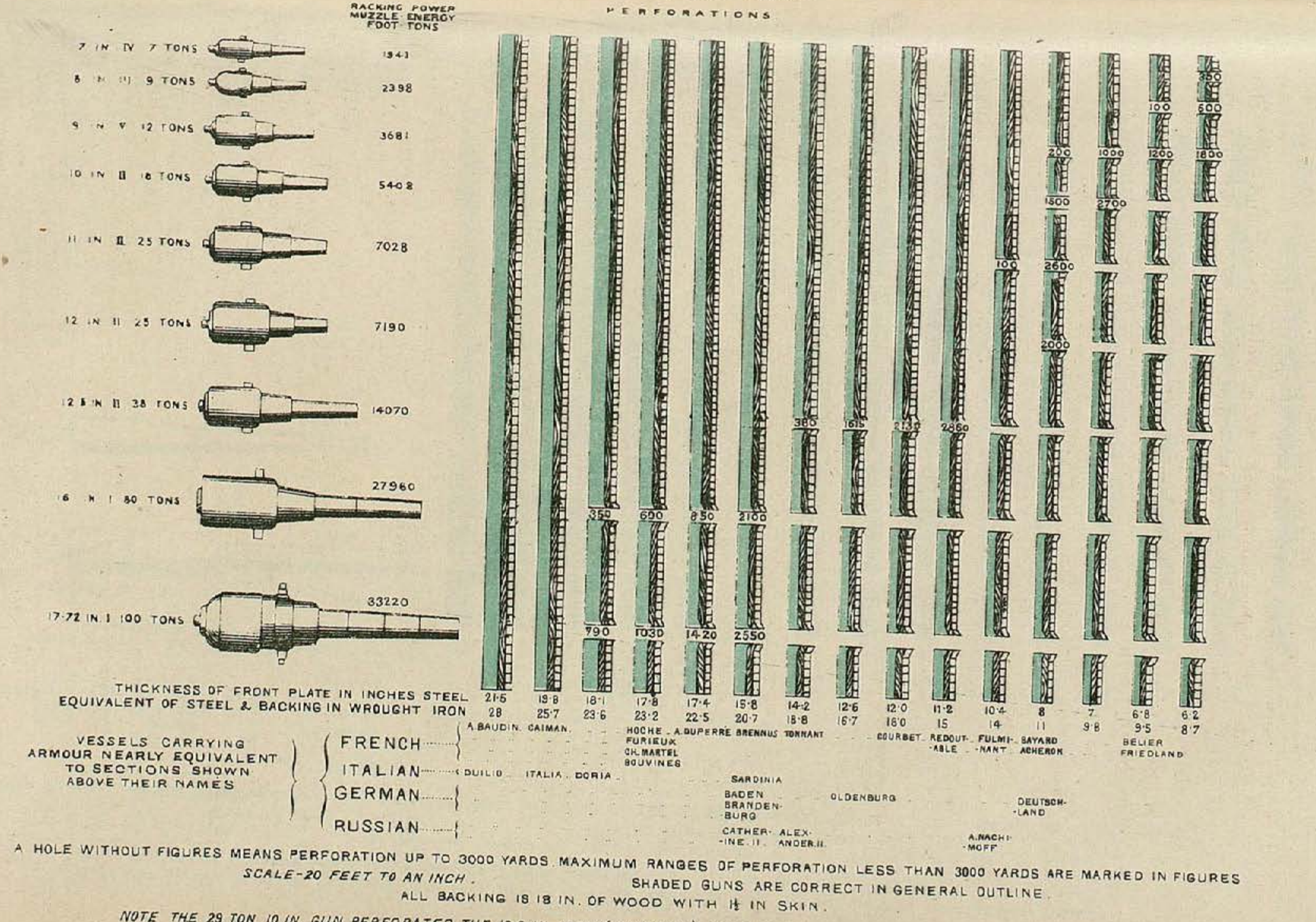
dam. On water being applied, it began to get through the cocoa cellulose in 25 seconds, and then gradually attained a flow of $1\frac{1}{2}$ gallons per minute, but failed to get through the corn pith for 45 minutes, when the test was discontinued.

The combustible qualities of each packing were then tried by exploding a 3-lb. shell in an iron chest containing cellulose. The cocoa burned, but the corn pith was only charred.

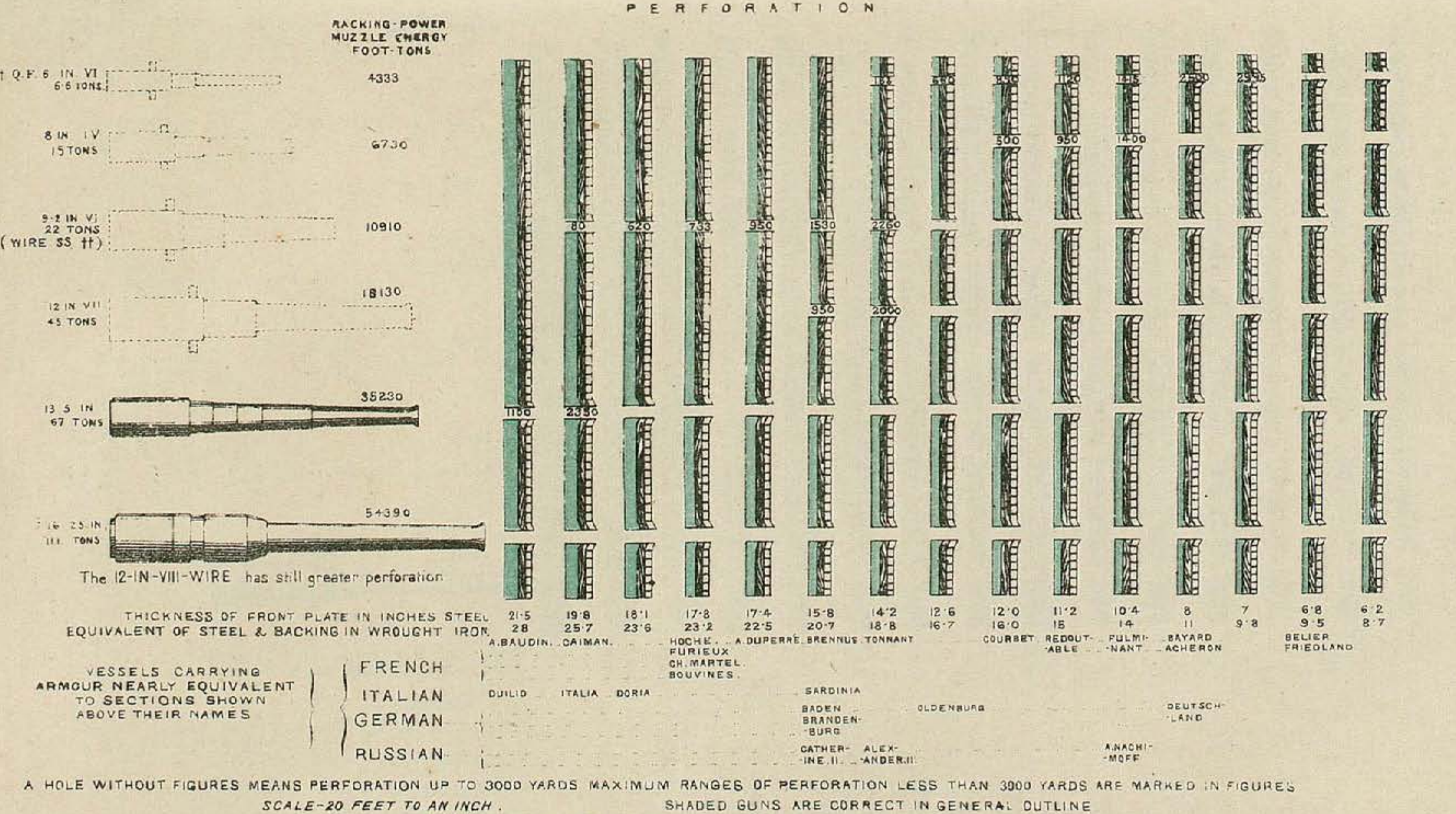
On the faith of these trials, Secretary Herbert ordered corn

cellulose to be used on the two warships "No. 4" and "No. 5." The figure herewith shows the manner of application to war vessels. Coals are, of course, often used in a similar way, and have the advantage of adding nothing to the weight of the ship, supposing the coals to be part of the supply carried for fuel, and coals have greater stopping power. They have, however, the disadvantage of not closing up the shot hole.

Pl I



BRITISH M.L. GUNS.
PERFORATIONS
RACKING POWER MUZZLE ENERGY FOOT TONS
7 IN IV 7 TONS 1941
8 IN III 9 TONS 2398
9 IN V 12 TONS 3681
10 IN II 18 TONS 5402
11 IN II 25 TONS 7028
12 IN II 25 TONS 7190
12.5 IN II 38 TONS 14070
16 IN I 80 TONS 27960
17·72 IN I 100 TONS 33220
THICKNESS OF FRONT PLATE IN INCHES STEEL
EQUIVALENT OF STEEL & BACKING IN WROUGHT IRON
21·5 28
19·8 25·7
18·1 23·6
17·8 23·2
17·4 22·5
15·8 20·7
14·2 18·8
12·6 16·7
12·0 16·0
11·2 15
10·4 14
8 11
7 9·8
6·8 9·5
6·2 8·7
350 790 690 1030 850 1420 2100 2550 380 1615 2132 2860 100 200 1500 2600 2000 1000 2700 100 1200 600 1800
VESSELS CARRYING ARMOUR NEARLY EQUIVALENT TO SECTIONS SHOWN ABOVE THEIR NAMES
FRENCH
A. BAUDIN. CAIMAN. HOCHE. FURIEUX. CH. MARTEL. BOUVINES. A. DUPERRE. BRENNUS. TONNANT. COURBET. REDOUTABLE. FULMINANT. BAYARD. ACHERON. BELIER. FRIEDLAND.
ITALIAN
DUILIO. ITALIA. DORIA.
GERMAN
SARDINIA. BADEN. BRANDENBURG. OLDENBURG. DEUTSCHLAND.
RUSSIAN
CATHERINE II. ALEXANDER II. A. NACHIMOFF.
A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES
SCALE-20 FEET TO AN INCH.
SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.
ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN SKIN.
NOTE THE 29 TON 10 IN. GUN PERFORATES THE 18·8 IN IRON (TONNANT) SHIELD AT 1800 YDS. & ALL THINNER SHIELDS AT ALL RANGES.
† THIS GUN IS TAKEN FROM ELSWICK Q.F. GUN TABLE.

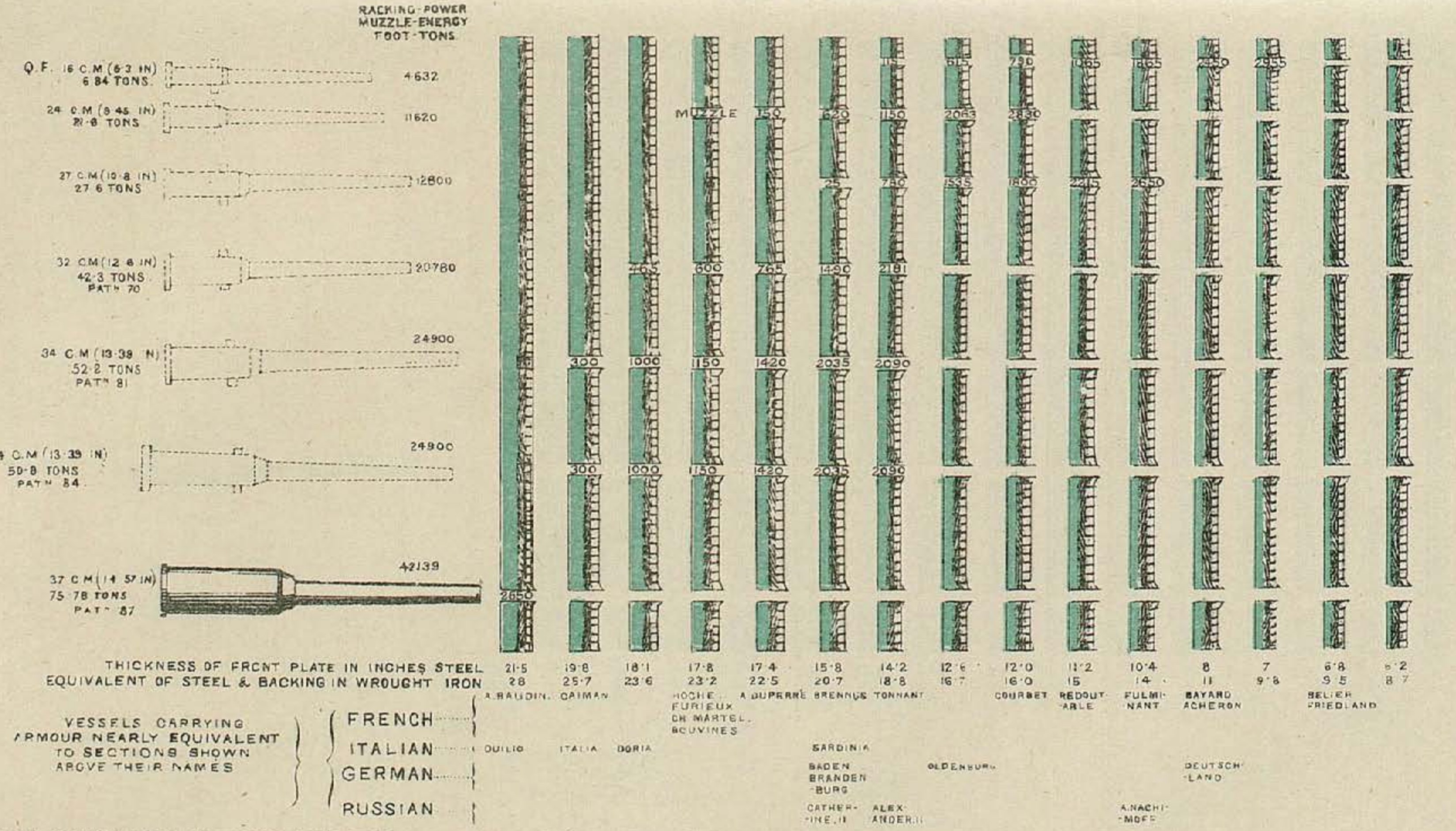


BRITISH B.L. GUNS.
PERFORATION
RACKING-POWER MUZZLE ENERGY FOOT-TONS
† Q.F. 6 IN. VI 6·6 TONS 4333
8 IN. IV 15 TONS 6730
9·2 IN. VI 22 TONS (WIRE SS ††) 10910
12 IN. VII 45 TONS 18130
13·5 IN. 67 TONS 35230
16·25 IN. 111 TONS 54390
The 12-IN-VIII-WIRE has still greater perforation
1100 2350
80 620 733 950 1530 2260
950 2000
180 550 830 1120 1515 2200 2935
500 950 1400
THICKNESS OF FRONT PLATE IN INCHES STEEL 21·5 19·8 18·1 17·8 17·4 15·8 14·2 12·6 12·0 11·2 10·4 8 7 6·8 6·2
EQUIVALENT OF STEEL & BACKING IN WROUGHT IRON 28 25·7 23·6 23·2 22·5 20·7 18·8 16·7 16·0 15 14 11 9·8 9·5 8·7
VESSELS CARRYING ARMOUR NEARLY EQUIVALENT TO SECTIONS SHOWN ABOVE THEIR NAMES
FRENCH A. BAUDIN. CAIMAN. HOCHE. FURIEUX CH. MARTEL. BOUVINES. A. DUPERRÉ. BRENNUS. TONNANT COURBET. REDOUTABLE FULMINANT BAYARD ACHERON BELIER FRIEDLAND
ITALIAN DUILIO ITALIA DORIA SARDINIA
GERMAN BADEN BRANDENBURG OLDENBURG DEUTSCHLAND
RUSSIAN CATHERINE II. ALEXANDER II. ANACHIMOFF
A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES
SCALE-20 FEET TO AN INCH.
SHADED GUNS ARE CORRECT IN GENERAL OUTLINE
ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN. SKIN
NOTE THE 29 TON 10 IN. GUN PERFORATES THE 18·8 IN. IRON (TONNANT) SHIELD AT 1800 YDS. & ALL THINNER SHIELDS AT ALL RANGES
† THIS GUN IS TAKEN FROM ELSWICK Q.F. GUN TABLE. †† PERFORATIONS CALCULATED BY TRESIDDERS-FORMULA

Pl II

FRENCH GUNS.

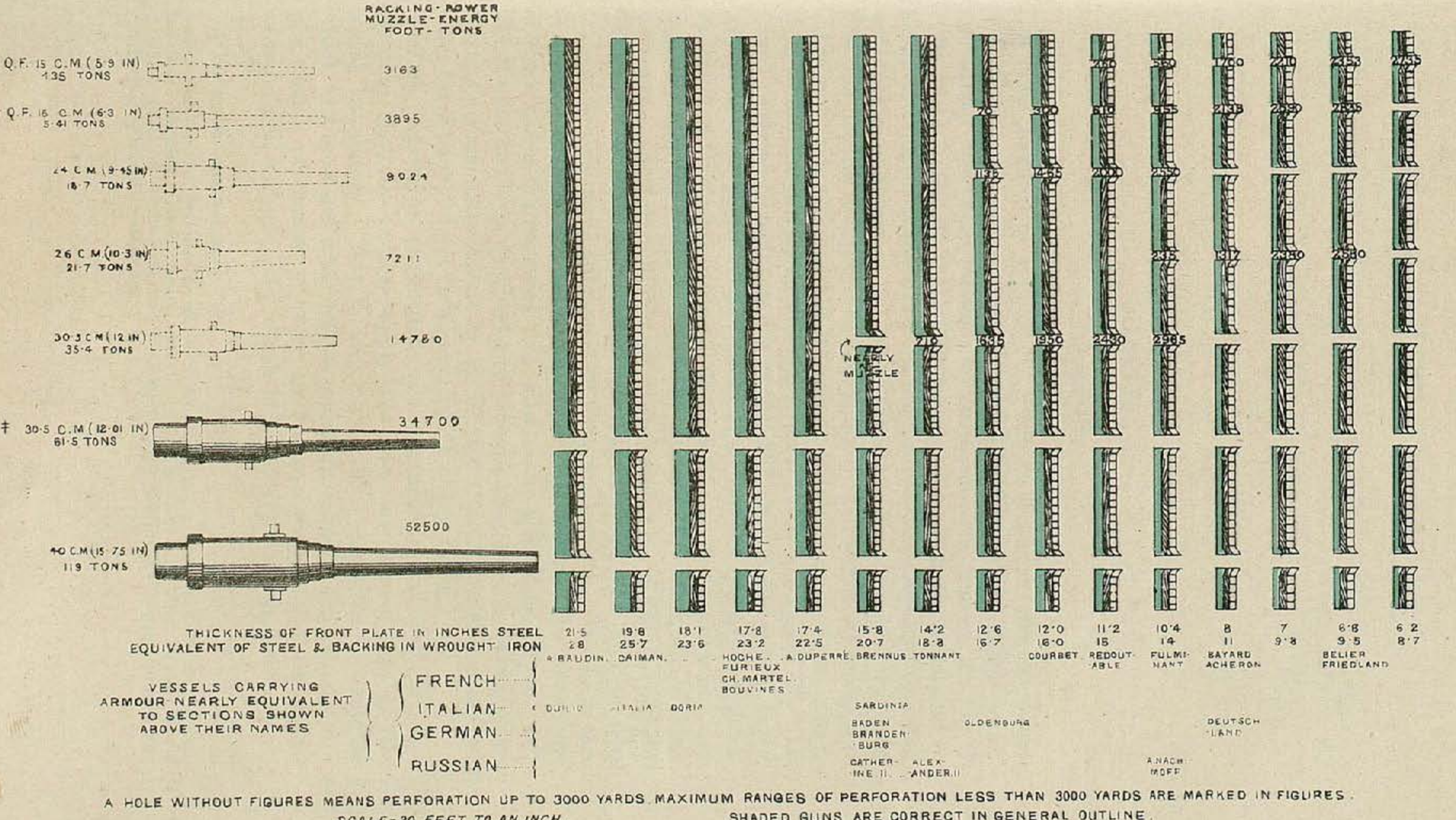
PERFORATIONS



A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES

SCALE—20 FEET TO AN INCH. SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.

ALL BACKING 18·18 IN. OF WOOD WITH 1½ IN. SKIN.



A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES.

SCALE-20 FEET TO AN INCH. SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.

ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN SKIN.

† TAKEN FROM KRUPP Q.F. GUN TABLE.

‡ TAKEN FROM KRUPP ORDNANCE AT CHICAGO.

CHAPTER II.

Ordnance.

The chief features of interest in ordnance at present are the extension of the quick-firing principle and the introduction of wire guns. As noticed elsewhere, methods of increasing the rate of the fire of heavy guns, including that of 12-in. calibre, have been introduced at Elswick. Guns of 9·45-in. (24-cm.) calibre may be occasionally entered as quick-firing pieces, as in Canet's table, but it must not be supposed that this implies that they fire more quickly than certain British pieces of the same size, although the latter are not termed quick-firing pieces. It is a difference of nomenclature. Abroad it is considered that the means provided to facilitate the service and quicken the rate of fire of certain heavier pieces entitle them to be termed quick-firing guns. In England this term is limited to guns firing a projectile which can be easily handled without the use of mechanical means, namely, the 8-in. gun. New wire 9·2-in. guns are coming in for naval and land service. The naval gun is that for the Powerful and Terrible (see table of British naval ordnance), 33 ft. in total length. The L.-S. gun is to be 5 ft. longer and more powerful in proportion. The mountings of these pieces are provided with alternative electric and hand gear. The former has been designed and brought into good working in the Royal Carriage Department by Sir George Clarke, but the guns and mountings have not yet been installed in either vessel.

Manufacture of A.-P. shot in Royal Laboratory.

With regard to projectiles, the manufacture of steel armour-piercing shot for service supply has now been commenced at the Royal Laboratory. This is important, as it embodies a principle which is a most desirable one to maintain, namely, the manufacture of a certain proportion of every kind of war store in the Arsenal, so as to furnish a standard by which to judge contract supplies.*

* For results obtained, see p. 362.

Authorities.—The *Engineer* for plates and matter; information obtained from manufacturers: Elswick, Canet, Krupp, Maxim; Captain Cowles, United States Naval Attaché; notes of United Service Institution Proceedings; the *Times*, *Engineering*; Artillery Institution Proceedings.

The Majestic firing trials.

The firing trials of the Majestic, which took place on September 26, 1895, at Portsmouth, are especially interesting, seeing that she is the first vessel of her class, which will include the nine most powerful armoured ships in our fleet. A full account of these trials appeared in the *Times* of September 27, 1895.

The armament consists of four 12-in. (46-ton) wire guns, mounted in the two barbettes, as well as twelve 6-in., and sixteen 12-pr. and twelve 3-pr. Q.-F. guns. The 12-in. guns are pieces of very great power for their weight, their energy being not far short of that of the 67-ton gun, and their perforation slightly in excess of that of the 110½-ton gun.* This reduction of metal is possible on account of the great strength of the wire, which is laid on in successive layers with the desired tension, involving the employment of 102 miles of wire. These pieces were fired at the rate of three rounds in 4 minutes. Six rounds were fired from a Q.-F. 6-in. gun in 50 seconds, but the estimated service rate is sixteen rounds in 3 minutes.

The mountings were designed and made at Elswick. The heavy guns are held on their cradles by thrust rings, and the arrangement admits of each gun being placed either in the right or left position by reversing it. The gun and mounting in the firing position balance on trunnions, by which means the recoil takes place in the line of fire in any position of elevation or depression. The guns can be loaded either simultaneously in a fixed position or independently in any position.

The guns are protected by an armoured hood or gun-house, which revolves with them in the barbette. The 6-in. guns are in casemates, so that the 12-pr. and 3-pr. guns only are unprotected. It can hardly be intended that these should all be manned in a regular close action, though some might be fought. The 12-pr. on the side of the conning-tower towards the enemy would probably come in for the fire concentrated on that part of the ship, and it is not conceivable that a man could work it for many minutes without being killed. It is to be remembered, however, that one principal function of lighter quick-firing guns is to meet torpedo-boat attack.

Firing trials of the Buenos Aires.

The following are the details of the firing trial carried out on board the Buenos Aires on 4th Dec., 1895, built at Elswick, for the Argentine Government. The scope of gun-fire and its ease of execution is of special importance in this class of vessel where the power of attack has been so greatly developed. Vessels have been constructed in which the batteries are so crowded that the fire of one gun interferes with another; in fact, cases have arisen where warning with a bugle

* See Table of British Rifled Ordnance.

has been thought desirable, to ensure the men of one gun's crew being uninjured by the firing of another. It is important to observe then that quick-fire enables guns to deliver the great volume of fire without crowding, and it may be noticed that the guns have a remarkable scope in direction, including horizontal fire fore and aft along the keel, and also that they have great elevation and depression.* The programme was carried out without any hitch or incident to report on Friday, 29th November, 1895.

No. of Round.		Gun.	Elevation.	Training.	Remarks.
1		8-in. aft †	Max. dep.	Port bow	
2		,, ,,	Horizontal	Line of keel	
3		,, ,,	Max. elev.	Starboard bow	Broadside (rounds 3–8)
4		6-in. No. 5	,,	,,	
5		4·7-in. No. 4	,,	,,	
6		,, No. 3	,,	,,	
7		,, No. 2	,,	,,	
8		6-in. No. 1	,,	,,	
9		,, No. 5	Horizontal	Starboard beam	
10	Starboard	4·7-in. No. 4	,,	,,	
11		,, No. 3	,,	,,	
12		,, No. 2	,,	,,	
13		6-in. No. 1	,,	,,	
14		,, No. 5	Max. dep.	Starboard quarter	Broadside (rounds 14–19)
15		4·7-in. No. 4	,,	,,	
16		,, No. 3	,,	,,	
17		,, No. 2	,,	,,	
18		6-in. No. 1	,,	,,	
19		8-in. fore	,,	,,	
20		,, ,,	Max. elev.	Port quarter	Broadside (rounds 20–25)
21		6-in. No. 5	,,	,,	
22		4·7-in. No. 4	,,	,,	
23		,, No. 3	,,	,,	
24		,, No. 2	,,	,,	
25		6-in. No. 1	,,	,,	
26		,, No. 5	Horizontal	Port beam	
27	Port	4·7-in. No. 4	,,	,,	
28		,, No. 3	,,	,,	
29		,, No. 2	,,	,,	
30		6-in. No. 1	,,	,,	
31		,, No. 5	Max. dep.	Port bow	
32		4·7-in. No. 4	,,	,,	
33		,, No. 3	,,	,,	
34		,, No. 2	,,	,,	
35		6-in. No. 1	,,	,,	
36		8-in. fore †	Horizontal	Line of keel	
37		—	—	—	
38		—	—	—	
39		—	—	—	
40		—	—	—	

3-pr. guns, three rounds per gun as convenient. Max. elevation, Max. dep., and horizontal.

† The 8-in. guns actually fired two rounds fore and aft on the day of trial.

* The maximum elevation for the 8-in., 6-in., and 4·7-in. guns are respectively 15°, 18°, and 20°, and the maximum depressions 5°, 7°, and 7° respectively.

Elswick Q.-F. 8-in. gun.

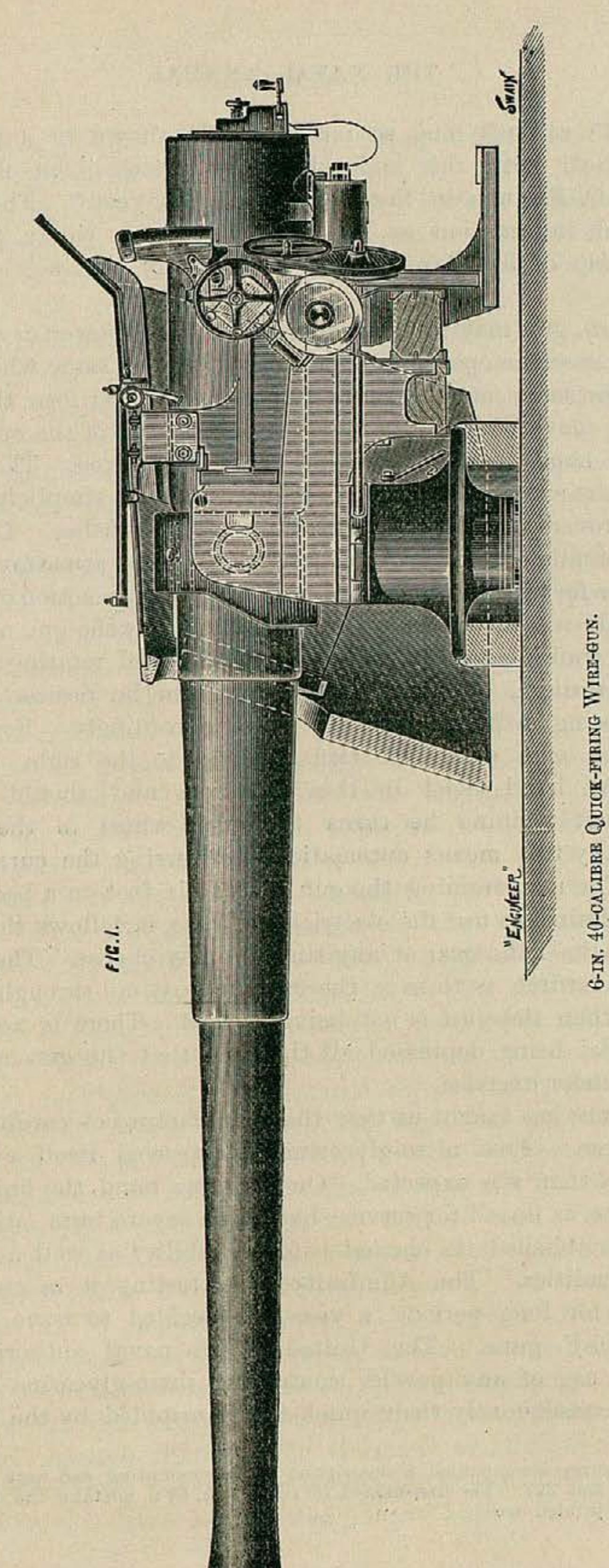
The Elswick 8-in. Q.-F. gun has been fully described in last year's *Annual.* It has a very high working velocity, viz., 2642 foot-seconds. It should, however, be remarked that the projectile with which this velocity is obtained is rather a light one, the weight having been retained at 210 lb., in order that for quick-firing it may be easily handled. There are heavier projectiles of 250 lbs., provided for use under special circumstances. The 8-in. gun is considered the heaviest gun which can be worked by hand as a quick-firer. In this connection it possesses a distinct advantage over the 9·2-in. gun, for although the latter will deal heavier blows, they will not be nearly as rapid. It has been suggested, therefore, that the 9·2-in. gun is one of those which might well be omitted in future, as too heavy for hand-working and too light to warrant the use of power. In the English Navy the only gun between the 6-in. and 10-in. is the 9·2-in., which is too far in calibre from the 6-in. and too near the 10-in. The 8-in. gun forms a much better intermediary.

Elswick gun shields.

The growth of shields affixed to gun-mountings, with a view to giving protection to the crew and to the working-gear, is of some interest. They have only come into use with breech-loading guns; but at first 1-in. or 2-in. was thought sufficient thickness. Now the shield even for a 4·7-in. gun is made of 4½-in. thickness in front. The method of attaching the shield to the mounting is of great importance. The old plan was simply to bolt it on, but experiment proved that under such conditions a blow on the shield was communicated to the mounting, and did almost as much damage to the latter as if there were no shield at all. Elswick has overcome this objection by adopting an "elastic attachment." The shields are bolted on to steel plates, bent into a C form, and the steel plates are bolted on to the mounting. With this system it is proved that a blow on the shield is only partially transmitted to the mounting, and the shield consequently becomes an important protector. Heavy shields on the old form of mounting would have caused very great difficulty in training, but now a new plan of mounting, known as the "pedestal mounting," reduces the friction of training to such an extent that the heavy shields can be easily handled.

In the pedestal mounting the gun and cradle fit into a Y piece, the stalk of which passes down into a pedestal, and rests on hard steel balls. The pedestal is about 2 ft. high, so that all the working parts of the mounting are kept well above the deck. Special attention is paid to balancing the gun, mounting, and shield, about the point of rotation, and thus in training there is only friction to overcome. Fig. 1 shows the 6-in. 40-calibre Q.-F. wire gun.

The mountings of the 8-in. Q.-F. wire guns of the Buenos Aires,



6-IN. 40-CALIBRE QUICK-FIRING WIRE-GUN.

though 45 calibres long, so far as can be shown in a photograph, are identical with this and with three plates given of the 8-in. Elswick Q.-F. guns in the *Annual* of last year.* The following additional information on the electric gear is partly taken from *Engineering* of 3rd January last, and partly obtained direct from Elswick.

Elswick electric gear for Buenos Aires 8-in. Q.-F. guns.

The 8-in. gun may be trained either by hand-power or electrically. In either case the operation is performed by the same wheels and in exactly the same manner; only with the electrical gear the gun and mounting move with hardly an effort on the part of the operator, and with the hand gear considerable effort is required. The system of varying the speed of training is reduced to great simplicity, and the motor is reversed without any sparking at the brushes. Directly the training handle is released, the circuit through the armature is broken. The motor for working the training gear is kept in action only so long as the hand-wheel for turning is kept rotating by the gun number, *i.e.*, the man training simply keeps the hand-wheel rotating (as though he were training by hand) in the direction he desires to go, the current being switched into the motor accordingly. For instance, should the man desire to train the gun to the right, he simply rotates the hand-wheel in this direction, and should he desire to give left training he turns the hand-wheel in the opposite direction, by this means automatically reversing the current to the motor. The man training the gun places his foot on a pedal switch when he desires to use the electrical gear, so it follows that he can easily use the hand gear at any time he may choose. The object of this pedal switch is to save the current passing through the field magnets when the gun is not being worked. There is no objection to the pedal being depressed all the time that the gun may be in action or under exercise.

Experience has taught us that the manufacture of cordite is beset with danger. Free nitro-glycerine has proved itself even more treacherous than was expected. On the other hand, the finished product, cordite, as issued for service, has borne severe tests satisfactorily and has established its character for reliability as well as for high ballistic qualities. The Admiralty, after testing it in the hottest magazines for long periods, a year ago decided to issue it for all types of Q.-F. guns. The United States naval authorities still forbid the use of any powder containing nitro-glycerine on board ship, and consequently their quick-fire is crippled by the necessity

* Three figures accompanied a description of the mounting and were printed on pp. 323, 325, and 327. The first-named of these had, by a mistake, the title "Canet 32-cm. Gun" printed over it.

of employing a powder which is only semi-smokeless, and which is reported to impede the firing very much.

Dangerous as nitro-glycerine is in the free state, it appears capable of being completely combined with gun-cotton. Dynamite, where it was only taken up mechanically, was liable to exude under provocation, but in cordite this is not the case. Danger and difficulty in manufacture are limited to a region which ought to be subject to control, and not liable to the varying circumstances and accidents of service; consequently, accidents in manufacture arising from conditions which do not exist on service are not likely to tell against the future of so valuable a compound as cordite, and, indeed, it is to be hoped that even the question of manufacture has now been mastered.

Bursting charges of shells.

Great as were the effects produced by shells charged with high explosives in the Resistance trials at Portsmouth and those of the Belliqueuse, black powder is still preferred as a bursting charge under some circumstances. There is still reluctance to employ any high explosive in a shell fitted with a base fuze. Consequently, all shells with sharp strong points for the perforation of thinner classes of armour, having fuzes in their base, are charged with powder. Wet gun-cotton, coated with collodion, was highly commended in Germany some years since, but an experiment conducted last year with gun-cotton at Indian Head, gave bad results. Two 4-in. shells were burst in chambers, one shell containing powder, the other wet gun-cotton. The powder shell smashed the chamber and set fire to the wood-work, while the wet gun-cotton made a great noise but did comparatively little damage. Reports on the effects of shells charged with powder fired in the battle of Yalu led to this trial, and it is thought that the high explosives now in use in the United States Navy may probably be replaced by powder. British naval officers have been heard to express the hope that any enemy they meet may carry large quantities of high explosive on board her.

From the above it may be concluded that the question of explosives generally is in a crude state. British vessels are supplied in increasing quantities with cordite for their guns, but high explosives for shells are regarded as dangerous, while the United States ships regard smokeless powder as too unsafe to use; but on the other hand, high explosives appear to have been already carried in their shells, and if now superseded by powder, the reason given is not danger but bad effect in action. The French are reported to have made repeated changes. In Germany smokeless powder has for many years past been freely employed, but how far its keeping powers on service have been tested is not known in this country.

Maxim-Schupphaus powder

A new smokeless powder, known as the Maxim-Schupphaus, has given good results experimentally in America. It differs from the Leonard and other nitro-types by combining from 5 per cent. to 10 per cent. of nitro-glycerine with from 94 to 89 per cent. of military gun-cotton. The advantage claimed for it over Cordite and Leonard powder, which contain 50 per cent. of nitro-glycerine, is its low temperature of combustion and the consequent reduction of erosion in the bore of the gun, nitro-glycerine and gun-cutton having relatively temperatures of combustion of 3000 and 2500° Fahrenheit. This powder-grain consists of a cylindrical stick, with seven or more longitudinal holes to cause an increased area of combustion and formation of gas as the shot moves up the bore. At Sandy Hook, with the 3·2-in. field-gun, 1 lb. 4½ oz. of Maxim-Schupphaus powder did the same work as 3¼ lbs. of black powder and with less pressure.

The following important summary of the characteristic features of French hydraulic gun-mountings is taken from J. S. Haddy's translation of a paper by Gustav Schwanda * :—

Characteristic features of French gun mountings.

"First, numerous safety arrangements exist which ensure the working of the gun, and make a mistake almost impossible. Next may be noticed the leading of the ammunition-hoist through the central pivot-tube and the vertical and oblique sliding guides of the carriage, so that the ammunition is brought close to the breech of gun, and loading is independent of training. Then the training arrangements themselves are to be remarked. Training is effected from outside by means of two chains wound round a central drum, set in motion by two hydraulic presses. This is convenient, saves weight, and enables the mechanism to be under the gun-platform, often under the protective deck, and nearly always under the water-line. Further is noticed the employment of accumulators for the hydraulic pumps, and the use of counterbalance weights for hand-levers to ensure their automatic and correct return on one side and to counteract the weight of the numerous connecting-rods, etc., on the other.

Canet's electric turret mounting.

"It may be seen that the general principles above enumerated are kept in view in the electric system of Canet, in which the French Government has taken the lead of the British. Our own Powerful and Terrible have barbette mountings for 9·2-in. guns worked by electricity, which appear to be excellent, but the ships will not be in commission for some time to come.

"The Société des Forges et Chantiers de la Méditerranée have turned out, or have now in progress, nearly forty turrets worked by electricity for the Latouche-Tréville, the Jauréguiberry, the d'Entre-

* "Journal of United Service Institution," April, 1895.

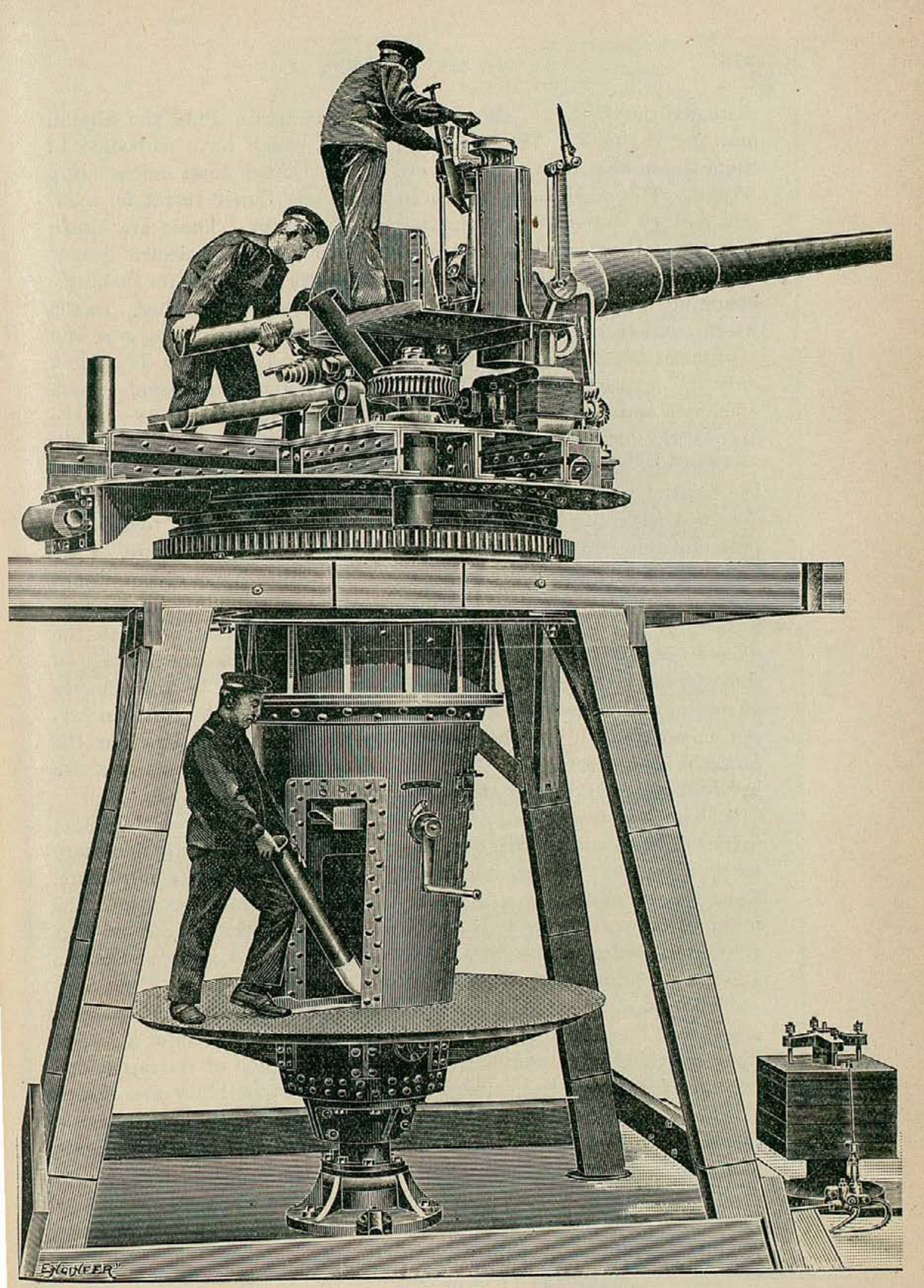


FIG. 2.

casteaux, the Pothuau, the St. Louis, the Captain Prat, the Skjold, and the Carlos V. Those last completed, which have embodied in them the newest improvements, are for the Danish coast defence ship Skjold. The work supplied includes (1) one Canet turret for a 24-cm. gun, (2) three Canet turrets for 12-cm. guns. These are closed turrets, and, as in all others of the same type, the electric gear is supplemented by alternative hand-gear, with provision for instantly changing by means of switches from one system to the other. In the 24-cm. gun-turret electric working is applied to laying the gun, and also to raising the ammunition. In the 12-cm. turrets it is applied only to laying the gun. In the latter, hand-gear provides such efficiency and speed that there is no necessity for having recourse to an electric motor.

"The electric apparatus for laying the gun is of the type known as the 'cartouche électrique type.' Excellent results, it is said, were obtained with this system on the Latouche-Tréville, and these have been entirely confirmed by trials which took place at Havre in the presence of the Danish Commission, and which have given prominence again to the greatest accuracy with which laying can be performed by the use of the 'cartouche électrique,' identified with the names Canet, Hillairet, and Hugnet. Not only has the captain of the gun complete control throughout, whatever may be the velocity of rotation of the turret, so that he can stop it dead, but also in laying he can at will, in either direction, make corrections less than the fortieth of a degree. These trials have been repeated many times before a great number of officers.

"Thanks to the special arrangements which characterize the Canet turret system, and to the adjustment of weight, the work necessary to give rotation to the running weight is reduced to a minimum. Thus for the motor for rotation of the turret of the 24-cm. gun, the nominal power is 15 horse-power, and hardly two-thirds of this amount is ordinarily required. For the rotation of the turret of the 12-cm. gun a motor of 3 horse-power is sufficient.

"The ammunition-hoist of the 24-cm. gun-turret is worked by a motor of 8 horse-power. It is controlled by a commutator of a special kind, provided with automatic return to either end of its range, and with special safety arrangements to prevent the possibility of accident.

"The engravings (Figs. 2 and 3) show the general arrangements of the turrets. No attempt is here made to give a lengthened description in detail. A report on these turrets has been made at the request of M. Neilson, formerly director of construction, and now director of the dockyards of Burmeister and Wain at Copenhagen. The Danish Commission, entrusted with the testing and acceptance trials at Havre,

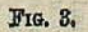


Fig. 3.

consisted of MM. Schwanenflügel and Rasmutten. The President of the French Republic was present at the trials, and himself worked the 24-cm. turret."

Maxim solid steel gun.

Maxim has succeeded in making solid steel guns with specially-hardened bores up to 5·7-in. calibre. The gun is made out of a single ingot of steel; the bore is made and rifled, and afterwards subjected to a process which both hardens the interior and causes the exterior to be brought into a state of tension, so as to support it as in a built-up gun. This process consists in causing the gun to revolve on its axis in the vertical position in a furnace specially made for this purpose. The interior is then chilled by the passage of water through it. Experience enables the conditions to be arrived at which secure the desired tension on the exterior part as it shrinks on to the interior, after the latter has become chilled and set. The rotation is adopted to prevent distortion, and beyond such expansion as can be reckoned on and provided for, it is necessary that the bore should not be materially altered in form and dimensions, for it is rendered very hard, and lap welding is the only subsequent operation performed on it. It is reported to resist erosion in a remarkable way.

Admiral Colomb on elements of foreign warships.

On March 18th, 1896, Admiral Colomb read a paper in the Theatre of the United Service Institution on the Fighting Powers of War Ships. Referring to papers on the question read by Captain Noel and Sir Nathaniel Barnaby in a more elementary shape, the author explained that he had compiled tables dealing with the various elements constituting power in war ships which admit of direct comparison taken singly, but that it is not possible to combine them, giving the due weight to each, which would enable the combined elements of power of one ship to be compared with those of another, because no two competent judges would probably agree in the weight to be given to each element. Admiral Colomb mainly limited the scope of his paper to the furnishing of data which admitted of such use as might be made of them, although the elements were united in certain of his tables. The elements in question were: date of laying down, displacement, weight of hull, weight of armour, number of guns, total calibre of guns, energy of one round per gun, total energy per minute, total shell charge, torpedo tubes, and the amount of the above per 1,000 tons displacement, speed, coal capacity, &c., as well as combinations of the above elements. This paper is extremely valuable as furnishing ground and suggesting methods for the comparison of the fighting powers of ships.

NOTES OF ALTERATIONS IN TABLES OF ORDNANCE.

The perforations are calculated on Krupp's system for velocities exceeding 2000 f.-s.

The chief new feature in the British Table is the wire 9·2-in. B.L. gun. New pieces being introduced in France are mentioned, but details are not yet available. In Germany are two new long 24-c.m. guns, and a 6-c.m. Boat gun. Russia must possess more powerful guns than are shown—probably wire guns—they may not exist on board ship yet possibly, but are in experimental use, see p. 350.

Great additions are made to the Elswick Table of Q.F. guns, and the Canet Table is a new one altogether. As noticed elsewhere, the service is accelerated by automatic gear and other means in Elswick guns up to and including the 12-inch, but the expression quick-firing is limited to those calibres whose projectiles can be easily handled, that is the 8-inch gun and under. The Elswick rates of fire also are those obtained at sea under service conditions.

BRITISH RIFLED ORDNANCE.

(Chiefly founded on the official "List of Service Ordnance, 1891." Corrected by Official List, 1895, and subsequent information.)

Ordnance.										Charge (full).	Charge (cordite).		Projectile.						Ballistics (with full charges).				
Nature.					Chamber.		Rifling. Twist one turn in														Perforation of wrought iron.		
Calibre or Pr.	Weight.	Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Diameter.	Length to base of projectile.	Least at breech.	Greatest at muzzle.	System.†	Weight.‡	Weight.	Size.	Diameter.	Weight.§	Bursting Charge of Common Shell.	Value of $\frac{d^2}{w}$.	Value of $\frac{w}{d^3}$.	Muzzle velocity.	Total muzzle energy.	Muzzle energy per ton of gun.	At muzzle.	At 1000 yards range.	At 2000 yards range.
				calbs.	ins.	ins.	cals.	cals.		lbs.	lbs. oz.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft tons.	ins.	ins.	ins.
B.L. GUNS.																							
16·25-in.	110½ tons.	I.	524·0	30·0	21·125	84·5	130	30	P.E.O.C.	960 S.B.C.	..	..	16·25	1800	‡‡187½ / **179¼	0·147	0·420	2087	54,390	492	37·5p	32 0	30·1
13·5-in.	69 & 67 tons.	I. II. III. & IV.	433·0	30·0	18·0	66·5	120 or 60	30	P. Rifling increasing twist, in E.O.C. System from 0. Hook Sect. II. from 1 in 60; all others belong to Hook Sect. I. except 12-in. wire, which is special.	630 S.B.C.	..	..	13·5	1250	**85 9/16	0·146	0·508	2016	35,230	511 / 526	34·2p	28·2	26·4
12-in.	45 & 46 tons.	III. IV. V. & V.w	328·5	25·25	16·0	48·0	120	35		295 P.Br.	..	..	12·0	714	31 9/16 / ‡‡95 / **79	0·202	0·413	1914	18,130	403 / 394	22·6	20·6	18·8
12-in.	46 tons.	VIII. Wire	445·5	35·43	16·0	70·0	0	30		..	167 8	50/14	12·0	850		0·169	0·492	2400	33,940	738	38·5p	34·6p	31.2p
10-in.	29 tons.	II. III. III.A & IV.	342·4	32·0	14·0	54·0	60	30		252 P.Br.	..	..	10·0	500	37¾	0·200	0·500	2040	14,430	498	25·4p	20 4	18·6
9·2-in.	21 & 22 tons.	I. & II.	255·8	25·56	11·0	44·0	118·5	35		140 P.Br.	..	..	9·2	380	18½ / ‡‡33 / **31 14/16	0·223	0·488	1781	8,356	411 / 392	17·7	15·9	14 4
9·2-in.	24 & 22 tons.	III. V. VI. VI.A&C & VII.	310·0	31·5	12·0	43·0	120	30		164 P.Br.	..	..	9·2	380		0·223	0·488	2035	10,910	455 / 496	22·9p	18·15	16 6
9·2-in.	23 tons.	Wire	..	..	..	..	..	..		..	..	..	9·2	380	..	0·223	0·488	2347	14,520	835	28·4	24·5	19·4
8-in.	14 tons.	III.	226·3 / 222·5	25·6	10·5	34·5	120	35		104 P.Br.	..	..	8·0	210	13½ / ‡‡29	0·305	0·410	1953	5,554	427 / 397	15·4	13·4	11·7
8-in.	15 tons.	IV.	254·5	29·6	10·5	38	110	35		118 P.Br.	..	..	8·0	210	‡‡18½	0·305	0·410	2150	6,730	449	19·0p	14·9	12·9
8-in.	14 tons.	VI.					60	30															
6-in.	82 cwt.	(80 pr.)	162·6	26·0	7·5	27·4	0	40		34 S.P.	..	..	6·0	78·44	6 2/16 / ††7¾	0·450	0·370	2200 / 1880	7,047 / 1,961	490 / 484	19·6p / 10·5	15·4 / 8·4	13·5 / 6·8
6-in.	89 cwt. / 5 tons.	III. a / III. b	170·7	25·53	8·0	26·75	120	35		36 E.X.E. / 48 E.X.E.	14 12	20/14	6·0	100	7 6/16 / **9 13/16	0·360	0·463	1960	2,665	533	12.4	10·5	8·9
6-in.	5 tons.	IV. / VI.	173·5	26·0	8·0	26·75	120 / 60	35 / 30		48 E.X.E.			6 0										
5-in.	38 cwt. / 40 cwt.	II. / III. IV. & V.	139·15	25·07 / 25·0	5·75	19·05	117 / 120	25	All Hook Section I. or II. P.	15·5 S.P.	4 7¼	7·5/11	5·0	50	4 1/16 / ‡‡6 15/16	0·500	0·400	1750	1,062	559 / 531	8·5	6·7	5·4
4-in.	23 cwt. / 26 cwt.	II. IIP. III. IIIA. IV. V. & VI.	120·0	27·0	5·3	18·5	120	30		12 S.P.	3 1	5/11	4·0	25	2 14·5/16	0·640	0·391	1900	625	544 / 481	7·2	5·4	4·0
20-pr.(3·4)	12 cwt.	I. (L.)	107·5	29·0	3·9	15·5	120	25		6 S.P.	..	..	3·4	18·6	2 1/16	0·593	0·496	1677	380	633	..	..	..
12-pr.(3·0)	7 cwt.	I. (L.)	92 35	28·0	3·63	11·0	120	28		4 S.P.	1 0½	5/11	3·0	12·5	‡‡1 6·5/16 / 4/16	0·720	0·463	1720	256	740	..	..	..
M.L. GUNS.																							
17·72-in.	100 tons.	I. L.	391·85	20·48	19·7	59·72	150	50	P.Pl.	450 Pr.[1] Bl. or Pr.[2]	..	..	17·72	2000 0	106	0·157	0·359	1548	33,220	332	25·1	23·3	21·6
16-in.	80 tons.	I.	321·0	18·0	18·0	59·6	0	50	P.Pl.	450 Pr.[1] Br	..	..	16·0	1700 0	75 6/16 / c112 8/16	0·151	0·415	1540	27,960	350	24·3	22·5	20·9
12·5-in.	38 tons.	I.	230·0	15·84	Unchambered		0	35	W.	130 Pr.[2] or 165 Pr.[1] Bl	..	..	12·5	818·0	37 8/16	0·191	0·419	1442	11,820	311	17·4	16·0	14·7
12·5-in.	38 tons.	II.	222·8	15·84	14·0	41·125	438	35	W.	200 E.X.E. / 210 Pr.[2] or Pr.[1] black								1575	14,070	371	19·3	17·5	15·9
12-in.	35 tons.	I.	195·0	13·54	Unchambered		0	35	W.	110 Pb.[2]	..	..	12·0	714·0	34 10/16	0·202	0·413	1340	9,566	273	15·9	14·5	13·2
12-in.	25 tons.	II.	182·5	12·09	"		100	50	W.	85 Pb.[2]	..	..	12·0	614·0	28 2/16 / c61 10/12	0·235	0·355	1292	7,190	288	13·4	12·1	11·0
11-in.	25 tons.	II.	180·0	13·18	"		0	35	W.	85 Pb.	..	..	11·0	548·0	27	0·221	0·411	1360	7,028	281	14·2	12 9	11·7
10-in.	18 tons.	II.	180·0	14·55	"		100	40	W.	70 Pb.	..	..	10·0	410·0	23½	0·244	0·410	1379	5,408	300	13·1	11·7	10·5
9-in.	12 tons.	V.	156·0	13·89	"		0	45	W.	50 Pb.	..	..	9·0	256·0	17	0·316	0·351	1440	3,681	307	11·4	9·8	8·5
9-in. ‖	12 tons.	VI. (L.)	145·75	13·89	"		100	35	P.	50 Pb.	..	..	9·0	360·0	‡‡27 12/16	..	..	1194	..	..	..	..	..
8-in.	9 tons.	III.	144·0	14·75	"		0	40	W.	35 Pb.	..	..	7·92	179·0	→ 17 12/16	0·358	0·350	1390	2,398	266	9·7	8·2	7·1
7-in.	90 cwt.	I.	131·0	15·86	"		35	35	W.	22 Pb.	..	..	6·92	114·6	→ 11 1/16	0·428	0·334	1325	1,395	310	7·9	6·5	5·7
7-in.	6½ tons.	III.	133·0	15·86	"		35	35	W.	30 Pb.	..	..	6·92					1525	1,848	284	9·2	7·2	5·9
64-pr.	64 cwt.	III.	118·0	15·47	"		40	40	Pl.	10 R.L.G.[4]	..	..	6·28	64·5	→ 8 8/16	0·588	0·271	1390	865	270	..	..	..
64-pr.	71 cwt.	I.	122·72	16·42	Unchambered		40	40	Pl.	8½ R.L.G.[4]	..	..	6·29	64·5	→ 8 8/16	0·588	0·271	1260	715	201	..	..	..
40-pr.	35 cwt.	II. L.	120·0	22·0	"		35	35	W.	6¾ R.L.G.[4]	..	..	4·75	38·8	→ 3 6/16	0·582	0·362	1425	546	312	..	..	..
25-pr.	18 cwt.	I. L.	98·0	22·0	"		35	35	W.	4½ R.L.G.[4]	..	..	3·94	24·96	→ 1 13·5/16	0·622	0·408	1350	315	350	..	..	..
16-pr.	12 cwt.	I. L.	78·0	19·0	"		30	30	F.M.	3 3/16 R.L.G.[4]	..	..	3·54	16·1	→ 1 2/16	0·771	0·366	1355	205	342	..	..	..
15-pr.	422 lbs.	I. L.¶	70·5	20·0	3·2 (decrsd.)		60	20	P.	1½ R.L.G.[2]	..	..	3·3	14·25	2 6/16	..	..	1040	113	600	..	..	..
13-pr.	8 cwt.	I. L.	92·0	28·0	3·15	14·13	100	30	P.	3¼ R.L.G.[4]	..	..	3·0	13·0	11/16	0·689	0·484	1595	232	580	..	..	..
9-pr.	8 cwt.	I. & II.	72·0	21·17	Unchambered		30	30	F.M.	1¾ R.L.G.[2]	..	..	3·0	9·1	→ 8 12/16	0·996	0·335	1330	119	298	..	..	..
9-pr.	6 cwt.	I.	61·0	17·67	"		30	30	F.M.	1½ R.L.G.[2]	..	..	3·0					1250	97	323			
9-pr.	6 cwt.	II. / III. IV.	74·5 / 74·875	22·0	"		30	30	F.M.	1¾ R.L.G.[2] / 1½ R.L.G.[2]	..	..	2·94	9·1		0·956	0·356	1330	119	397	..	..	..
2·5-in.	400 lbs.	I. L.¶	70·45	26·6	2·56	11·07	80	30	P.	1½ R.L.G.[2]	..	..	2·5	7·25	4·5/16	0·819	0·488	1440	101	377	..	..	..
7-pr.	200 lbs.	IV.	41·0	12·0	Unchambered		20	20	F.	¾ R.F.G.	..	..	2·94	7·29	→ 7·25/16 / 14·5/16	1·185	0·287	950	46	515	..	..	..
R.B.L. GUNS (screw).																							
7-in.	82 cwt.	..	120·0	14·21	7·2	16·0	37	37	P.	11 R.L.G.[2]	..	..	7·0	91·25 / 108·3	8 4/16 / 10 5/16	0·537	0·266	1100	909	222	..	..	..
40-pr.	35&32cwt.	..	121·0 & 120	22·39	4·96	13·5	36½	36½	P.	5 R.L.G.[2]	..	..	4·75	40·7	2 6/16	0·554	0·380	1160	380	217	..	..	..
20-pr.	15&13cwt.	..	66·125	14·43	3·94	11·0	38	38	P.	2½ R.L.G.[2]			3·75	21·8	1 5/16	0·645	0·414	1100	183	244	..	..	..
12-pr.	8 cwt.	..	72·0	20·458	3·2	8·5	38	38	P.	1½ R.L.G.[2]	..	..	3·0	11·25	8/16	0·800	0·417	1239	200	299	..	..	..
9-pr.	6 cwt.	..	62·0	17·5	3·2	7·0	38	38	P.	1⅛ R.L.G.[2]			3·0	8.56	6/16	1·052	0·317	1055	66	220	..	..	..

L., Land service only. * The Roman numeral is the number of the pattern given. Further differences in pattern are indicated by letters a, b, and c.
† P. means Polygroove; Pl., Plain; W., Woolwich; F., French; F.M., French modified; H., Henry; E.O.C., Elswick Ordnance Co.
‡ S.B.C. (in column for charge) means Slow-burning Cocoa; P.Bl. stands for Prismatic Black; P.Br. for Prismatic Brown; Pb., Pebble; R.L.G., Rifle Large Grain; L.G., Large Grain; E.X.E., Experimental letter E.
§ For the higher natures the weight of projectile given is for Palliser shot; for the lower natures it is for filled common shell. ** Cast steel. ‡‡ Forged steel. †† Double shell. ‖ For high-angle fire.
¶ Mountain-service jointed gun. §§ There is a 6-cwt. 12-pr. Wire Gun for land service. → Studded projectiles. a Unchase-hooped. b Chase-hooped. c For steel common shell. p Perforation by Krupp's formula.

BRITISH RIFLED ORDNANCE—*continued.*

(Chiefly founded on the official "List of Service Ordnance, 1891." Corrected by Official List, 1895, and subsequent information.)

Ordnance. Nature. Calibre or Pr.	Nature. Weight.	Nature. Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Chamber. Diameter.	Chamber. Length to base of projectile.	Rifling. Twist one turn in Least at breech.	Rifling. Twist one turn in Greatest at muzzle.	Rifling. System.†	Charge (full). Weight.‡	Charge (cordite). Weight.	Charge (cordite). Size.	Projectile. Diameter.	Projectile. Weight.§	Projectile. Bursting Charge of Common Shell.	Projectile. Value of $\frac{d^2}{w}$.	Projectile. Value of $\frac{w}{d^3}$.	Muzzle velocity.	Ballistics (with full charges). Total muzzle energy.	Muzzle energy per ton of gun.	Perforation of wrought iron. At muzzle.	At 1000 yards range.	At 2000 yards range.
				calbs.	ins.	ins.	cals.	cals.		lbs.	lbs. ozs.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.
QUICK-FIRING GUNS										lbs. oz.													
6·0 in.	7 tons	I. & III. II. (Wire)	249·25	40	..	..	60	30	P.	29¾ E.X.E.	13 4	30/14	..	100·0	..	0·360	0·463	1882 2200	2457 3356	351 479	12·0 16·1a	10·1 10·9	8·5 9·3
4·7 in.	41 cwt. 42 "	I. II. III. & IV. Wire	194·1	40	..	..	100	34·4	E.O.C.	12 0 S.P.	5 7	20/14	4·72	45·0	..	0·495	0·428	1786 2188	995·4 1494	485·7 711	8·6 11·9a	6·0 7·8	4·6 6·2
4 in.	26 cwt.	I. Wire	165·25	40	..	...	..	30	P.Pl.	..	3 12	15/14	..	25·0	..	0·640	0·390	2456	1046	654	11·2a	7·2	5·4
12-pr.	12 cwt.	I.	123·6	40	..	..	120	28	E.O.C.	..	1 9½	19/11	3·0	12·5	..	0·667	0·500	2200	423	677	8·1 a	5·2	3·8
12-pr. §§	8 cwt.	I.	87·6	28	..	..	60	28	E.O.C.	..	13½	10/11	3·0	12·5	..	0·667	0·500	1607	223·8	544	5·6	4·0	..
Hotchkiss . 6-pr...	8 cwt.	I. & II.	97·63	40·0	..	..	180	29·9	P.Pl.	1 15 Q.F.	b7¾	5/11	2·24	6·0	..	0·836	0·534	1818	137·5	344·8	3·9	2·8	..
Nordenfelt . 6-pr...	6 cwt.	I. II. & III.	104·4	42·3	..	..				1 15 Q.F.					..								..
Hotchkiss . 3-pr...	5 cwt.	I. & II.	80·63	40	..	..	25	25	P.Pl.	1 8 Q.F.	b6⅜	5/11	1·85	3·3	..	1·037	0·521	1873	80·3	321·2	3·1	1·8	..
Nordenfelt . 3-pr...	4 cwt.	I. L.	91·5	45·4		..							..	..	..	..	..	..	..	..	..	1·9	..
MACHINE GUNS.										grains.				oz. grs.									
Nordenfelt, 2 bar. 1-in.	180 lbs.	I.	52·75		..	..	35	35	H.	625 M.G.	..	..	1·0	7¼ 0	..	2·207	0·453	..	..	..	¾-in. at 200 yards.		
" 4 bar 1-in.	447 lbs.	III.**	57·0		..	..	35	35	H.														
" 5 bar 0·45-in.	160 lbs.	I. G. G.	46·0		..	..	22	22	H.												Same as MH.Rifle, which perforates ½ in. wrought iron plate at 600 yds., $\frac{3}{16}$ in. at 400 yds., ¼ in. at 100 yds.		
	143 lbs.	II. G. G.	42·25		..	..	22	22	H.														
Gardner, 1 bar 0·45-in.	76 lbs.	I. G. G.	47·0		..	..	22	22	H.	85 R.F.G.$_2$.	..	..	0·450	480	..	2·952	0·751	..	..	..			
" 2 bar 0·45-in.	120 lbs.	I. G. G.	47·0		..	..	22	22	H.														
" 5 bar 0·45 in.	268 lbs.	I. G. G.	53·5		..	..	22	22	H.														
Gatling, 10 bar 0·65 in.	787 lbs.	..	66·5		..	..	30	30	H.	270 R.F.G.$_2$.	..	..	0·65	1422	..	2·109	0·730	..	..	..	Not known.		
" 10 bar 0·45-in.	402 lbs.	I. G. G.	59·0		..	..	22	22	H.														
" (Acclesfeed)	266 lbs.	I. G. G.	51·0		..	..	22	22	H.	85 R.F.G.$_2$	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as MH.Rifle		
Maxim, 1 bar 0·45 in.	63 lbs.	I G. G.	43·75		..	..	22	22	H.														

* L., Land-service only, but might concern navy when serving on land. The Roman numeral is the number of the pattern given. E.X.E., Experimental letter E.

† P. means Polygroove; Pl., Plain; W., Woolwich; F., French; F.M., French modified; H., Henry.

§ For the higher natures the weight of projectile given is for Palliser shot; for the lower natures it is for filled common shell.

** I. and II. differ chiefly in being 7 lbs. lighter; I. has a pitch of rifling of 1 in 60 in.; G.G., Gardner Gatling; H., Henry.

a By Krupp's formula.

b With 4 drs. R.F.G.

AUSTRIAN NAVAL ORDNANCE.

	Krupp Steel B.L. Guns.											Uchatius. St., Br.					Cast Iron BL.
Designation by Calibre, in centimètres	30·5 L. 35 C. 80	26 L. 22	24 L. 35 C. 86	24 L. 22	21 L. 20	15 L. 35 C. 86	15 L. 35 C. 80	15 L. 26	15 L. 26	12 L. 35 C. 80	12 L. 35 C. 87	15 L. 25	15 L. 37	12 L. 35	9 L. 24	7 L. 15	15 L. 21
Calibre, in inches	12·01	10·24	9·45	9·27	8·24	5·87	5·87	5·87	5·87	4·72	4·72	5·87	4·72	4·72	3·43	2·60	5·87
Length: Total, in Feet	35·11	18·77	27·60	17·16	13·73	17·13	17·13	12·63	12·63	13·8	13·8	12·19	14·38	13·97	6·76	3·28	10·13
Length: Rifled Portion, in inches	314·8	148·4	233·2	135·9	105·0	151·4	149·6	105·7	111·6	128·5	126·3	111·4	123·2	123·8	57·5	23·8	89·8
Length: Powder Chamber "	69·9	46·1	69·3	41·7	37·0	37·8	35·4	29·3	23·4	24·0	26·3	23·6	36·6	31·65	16·5	11·0	18·0
Length: Of bore in calibres	35	19·0	35	22·0	20·0	35	35·0	25·8	25·8	35·0	35	24·9	37	35·0	23·7	15·0	18·4
No. of Grooves	68	32	25	32	30	36	36	24	36	32	32	36	32	32	24	18	30
Twist in calibres	..	70	26·9	70	59	45—25	25	68·4	45	25	25	45	45—25	25	45	30	63·2
Weight: Gun, tons	47·8	21·7	26·5	14·5	8·68	5·7	4·69	3·94	3·94	2·25	2·46	3·35	3·2	2·85	0·479	0·09	2·81
Weight: Breech Block, in lbs.	..	1951	..	1422	1080	445·3	..	321·9	321·9	..	..	209·4	..	211·6	55·1	18·7	176·4
Weight: Steel Shell "	1003·1	395·7	474·0	292·1	206·6	112·5	86·0	72·8	84·9	57·3	57·3	84·9	57·3	57·3	..	..	..
Weight: Chilled Shell "	..	..	..	..	196·2	..	..	..	..	..	..	..	..	..	..	..	..
Weight: Common Shell "	1003·1	354·2	474·0	263·5	172·0	112·5	69·9	67·2/65·5	69·4	57·3	57·3	69·45	57·3	57·3	14·02/14·22	6·42	6·11
Weight: Shrapnel Shell "	..	..	..	..	..	112·4	71·9	67·2/65·5	69·4	57·3	57·3	69·45	57·3	57·3	15·76	6·88	6·79
Weight: Case Shot "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16·53	6·94	38·4
Weight of Bursting Charge: Steel Shell "	10·6	8·8	5·1	6·6	4·4	1·3	1·76	1·65	2·09	0·55	0·55	2·09	0·53	0·55	..	..	..
Weight of Bursting Charge: Chilled Shell "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Bursting Charge: Common Shell "	35·7	20·3	17·9	15·0	15·0	5·29	3·86	3·86	5·07	2 2	2·2	5·07	2·20	2·21	0·46	0·18	1·87
Weight of Bursting Charge: Shrapnel Shell † in lbs.	..	..	..	..	..	1·26	1·10	1·08	1·08	0·57	0·57	1·08	0·57	0·57	0·20	0·09	0·90
Weight of Firing Charge: Steel and Chilled Projectile, in lbs.	308·6B	89·3 B	105·8A	76·1 B	50·7 C	39·0p	38·8*	21·6 C	20·9 C	19·8 B	17·0A	20·9 C	30·0 B	19·8 B	..	..	..
Weight of Firing Charge: Common Shell, in lbs.	308·6B	59·5	105·8A	44·1	30·9	39·0p	38·8*	14·3/21·6 C	20·9 C	19·8 B	17·0A	20·9 C	30·0 B	19·8 B	3·31/0·97	0·77 O/0·35	4·74O
Weight of Firing Charge: Exercising, in lbs.	154·3B	59·5	52·9A	44·1	30·9	28·7	19·6	21·6 C	20·9 C	11·0	..	20·9 C	19·8 B	12·13 B	3·31	0·77 O/0·35	4·74O
Weight of Firing Charge: Saluting "	19·8	19·8 O	15·4O	15·4 O	8·82 O	4·74	4·74 O	4·74 O	4·74 O	2·4	2·4	4·74 O	2·4	2·4	0·88 O	0·35	4·74O
Muzzle Velocity, in feet	1755·3	1575	2100	1587	1519	1962	1969	1641	1562	1755	1969	1562	1755	1755	1470	978	1017
Muzzle Energy: Total, foot-tons	21,420	6808	14,500	5104	3306	3000	2312	1358	1435	1215	1541	1435	1224	1224	..	..	..
Muzzle Energy: Per inch circumference, foot-tons	567·8	211·6	488·3	175·3	127·7	162·8	125·4	73·7	77·9	82·5	104·0	77·9	82·45	82·45	..	..	..
Thickness of Iron, perforated inches at Muzzle	24·8	15·0	27·4	13·7	11·6	13·4	11·7	8·8	9·1	9·4	10·5	9·1	9·45	9·45	..	..	..

NOTE.—C for cube powder; * prismatic powder; O ordinary powder (inferior); B brown prismatic. † Generally steel.
A Ammon cake powder, p Prismatic Ammon powder.

DANISH NAVAL ORDNANCE.

	Krupp B.L. Guns designated.											Armstrong M.L.					Finspong.
Designation by Calibre	35·5 cm.	30·5 cm.	26 cm. long.	26 cm. short.	21 cm.	15 cm. long.	15 cm. medium.	15 cm. short.	12 cm. long.	12 cm. short.	8·6 cm.	10 in.	10 in.	10 in.	9 in.	8 in.†	6 in.
Calibre, in inches	13·98	12·01	10·24	10·24	8·24	5·91	5·91	5·91	4·72	4·72	3·43	10·0	10 in.	10 in.	9·0	8·0	6·04
Total length, in feet	29·1	22·0	32·8	18·77	24·04	17·1	12·63	10·7	11·8	9·6	6·9	17·0	14·5	14·0	13·0	10·8	9·5
Length of Bore, including Powder Chamber — in inches	304·7	227·2	327·6	194·5	264·5	190·3	135·0	112·9	128·8	102·4	73·6	175·5	145·5	140·0	125·0	104 2	100·8
Length of Bore, including Powder Chamber — in calibres	21·8	18·9	32·0	19·0	35	32·2	22·8	19·1	27·3	21·7	21·3	17·5	14·55	14 0	1[illegible]·3	13·1	16·7
Number of Grooves	80	68	60	60	48	36	36	36	32	32	24	7	7	7	6	6	6
Twist of Rifling, in calibres	45	45	70–25	45	70–25	70–25	45	45	25	40	45	40	40	40	40	50	40
Total weight, including Breech-gear, tons	51·3	35·4	27·6	21·6	13·3	4·7	4·4	3·5	2·13	1·39	0·49	20·0	18·5	18·0	12·5	8·65	2·46
Weight of — Breech Block, lbs.	4695·8	2910	2006	1940	903·9	390·2	330·7	324·1	229·2	176·4	101·4	..	..	..	..	..	..
Weight of — Steel Shell, "	1157·4	725·3	451·9	451·9	238·1	112 4	..	86·0	..	44·1	..	400	400	400	..	..	..
Weight of — Chilled Shell, "	1157·4	725·3	..	451·9	..	..	86·0	86·0	..	44·1	..	400	400	400	250·2	165·3	..
Weight of — Common Shell, "	1157·4	725·3	451·9	451·9	238·1	112·4	69·4	69·4	57·3	36·2	15·2	400	400	400	250·2	131·2	55·1
Weight of — Shrapnel Shell, "	1157·4	725·3	451·9	451·9	238·1	112·4	86·0	86·0	57·3	44·1	..	..	..	..	..	..	15·4
Weight of — Case Shot, "	..	..	..	..	..	..	..	..	..	..	..	191·8	..	..	154·3	127·9	58·4
Weight of Bursting Charge — Common Shell, "	57·3	39·7	25·4	25·4	12·8	6·2	3·0	3·0	1·7	1·4	0·44	26·5	26·5	26·5	18·5	7 5	5·0
Weight of Firing Charge — Steel or Chilled Shell, lbs.	330·7	180·2	191·8	101·4	105·8	41·9	19·3	21·8	17·4	8·8	..	71·7	71·7	71·7	44·1	29·8	..
Weight of Firing Charge — Common Shell, "	330·7	180·2	191·8	112·4	105·8	41 9	19·3	21·8	17·4	8·8	3·3	71·7	71·7	71·7	44·1	19·8	60·6
Muzzle Velocity — Armour-piercing Projectile, feet	1762	1675	2018	1640	2021	1800	1565	1542	..	1416	..	1457	1368	1368	1368	1378	..
Muzzle Velocity — Common Shell, "	1762	1675	2018	1640	2021	1890	1683	1690	1720	1549	1457	1457	1368	1368	1368	1320	1076
Muzzle Energy — Total foot-tons	24910	14110	12770	8428	6745	2784	1461	1418	..	6130	..	5889	5192	5192	3246	2177	..
Muzzle Energy — Per inch circumference, foot tons	568·3	374·1	396·8	262·0	260·6	150·0	78·7	73·0	..	32·8	..	189·0	165·3	165·3	115·8	86·9	..
Perforation at Muzzle, in inches	24·8	20·0	23·4	16·7	16·9	12·8	9·1	8·8	..	5·8	..	14·1	13·1	13·1	10·9	9·5	..

NOTE.—Chilled projectiles will gradually be replaced by steel. † There is another Armstrong gun differing very little from this one.
Krupp has supplied 12-cm. and 8·7-cm. Q.F. guns.

DUTCH NAVAL ORDNANCE.

	Krupp Breech Loading.							Armstrong Muzzle Loading.			Dutch Breech Loading.		
Designation by Calibre, in centimètres	28	21	17	15 No. 1.	No. 2.	12 No. 1.	12	28	23	18	12 No. 2.	12l	7·5
Calibre, in inches	11·02	7·91	6·80	5·87	5·87	4·72	4·72	11·00	9·00	7·00	4·72	4·72	2·95
Total Length, in feet	20·01	24·04	13·94	12·63	17·13	6·89	13·78	14·42	13·00	11·00	6·89	13·78	7·87
Length of Rifled Portion of bore, in inches	170·8	222·2	112·7	111·8	151·4	61·4	128·5	119·0	104·0	95·5	61·4	..	43·2
Length of Powder Chamber "	36·4	42·4	36·0	23·2	37·7	13·0	24·0	26·0	21·9	15·5	13·0	..	6·7
Length of bore, in Calibres	18·8	35	21·9	23·0	35	15·8	35	12·1	14·0	15·9	15·8	35	17·5
Number of Grooves	64	48/64	42	36	44	12	32	9	6	3	12	32	20
Depth of Grooves, inches	0·069	0·059	0·118	0·118	..	0·049	..	0·20	0·18	0·18	0·118	0·06	0·049
Twist of Rifling in Calibres	45	∝ 25	45	40	25	40	25	∝ 45	∝ 45	35	40	∝ 45	∝ 30
Total Weight, in tons	27·21	12·79/13·98	5·51	3·94	4·72	0·79	2·26	24·46	12·50	7·17	0·93	2·31	0·21
Firing Charge — Armour-piercing Projectile, in lbs.	121·3	99·2	27·6	20·9	49·6	..	19·8	86·0	50·7	30·0	..	19·5	..
Firing Charge — Common Shell "	121·3	99·2	27·6	20·9	49·6	2·43	19·8	86·0	50·7	13·9	2·43	19·8	0·82
Weight — Armour-piercing Projectile "	560·0	308·6	132·3	86·0	112·2	41·0	57·3	533·5	249·1	114·6	..	57·3	..
Weight — Common Shell "	476·2	308·6	112·4	69·4	112·2	29·5	57·3	535·7	262·4	116·8	29·5	57·3	9·5
Weight — Case Shot "	273·4	..	63·9	41·9	..	26·5	57·3	185·2	149·9	68·3	26·5	..	9·3
Bursting Charge — Armour-piercing Projectile "	6·6	4·6	2·2	1·1	..	0·44	..	4·4	2·2	2·2	..	..	..
Bursting Charge — Common Shell "	26·5	12·3	6·6	6·6	..	2·0	..	28·7	17·6	8·8	1.8	..	0·44
Muzzle Velocity, feet	1558	1739	1558	1558	2001	971	1755	1332	1476	1558	951	1804	958
Muzzle Energy — Total, in foot-tons	9423	6471	2226	1447	3115	..	1224	6563	3763	1929	..	1264	..
Muzzle Energy — Per inch Circumference, foot-tons	272	260·7	104	84	169·0	..	82·5	191	134	89	..	85·2	..
Perforation at Muzzle, in inches	17·0	16·8	10·5	9·1	13·6	..	9·4	14·0	11·9	9·7	..	9·6	..
Metal employed or system of construction	Steel Jacket and Hoops.		Steel-hooped.		Steel Jacket and Hoops.	Steel-hooped.	Steel Jacket and Hoops.	Steel Tube and Wrought Iron.			Bronz		

NOTE.—The 23-cm. ML. guns also discharge 113-Kg. (249·1 lbs.) steel shells and 113-Kg. solid shot. The 18-cm. ML. guns discharge steel shells of 51-Kg. (112·4 lbs.) and segment shells of 53-Kg. (116·8 lbs.). The 7·5-cm. BL. guns discharge ring-shells of 4·3 Kg. 9·5 lbs. Of the older guns there are yet extant three sorts—rifled 16-cm. muzzle-loader (mostly bronze), and rifled bronze 7-cm. and 5-cm.

FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1887.					1870–81.	70–81. 70–84.	1884.					1881.									
Desig. by Calibre, in cms.	34	30	27	24	19	27	32	34	27	24	16	14	34 long.	34 short.	27	24	16 heavy.	16 light.	14	10	mm. 90	mm. 65
Calibre, in inches	13·39	11·81	10·80	9·45	7·64	10·80	12·6	13·39	10·80	9·45	6·49	5·45	13·39	13·39	10·8	9·45	6·49	6·49	5·46	3·94	3·54	2·57
Total length, in feet	..	..	..	..	..	23·97	27·93	..	28·47	24·89	17·04	..	33·69	25·32	27·12	23·70	15·14	15·14	14·3	8·6	7·1	3·58
Length of Bore, in inches	..	..	..	..	..	269·0	313·8	..	..	..	..	..	380·6	280·2	306 9	269·3	180·9	180·9	162·6	102·6	77·9	41·2
Length of Bore, in calibres	42	45	45	42	45	25	25	30	30	30	30	30	28·5	21·0	28·5	28·5	28	28	28	26	22	16
Number of Grooves	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	50	50	42	30	28	20
Depth of Grooves, inches	..	..	..	..	..	0·059	0·059	..	..	..	..	..	0·067	0·067	0·059	0·055	0·039	0·039	0·035	0·028	0·024	0·020
Rifling Twist	..	..	..	..	..	7°	7°	..	..	..	..	..	7°	7°	7°	7°	7°	7°	7°	7°	7°	8°
Total weight, in tons	75·78	44·3	34·1	21·26	13 8	24·6	42·3	50·8	27·7	17·9	5·4	3·15	52·2	47·2	27·4	17·7	4·9	3·9	3·2	1·18	0·54	0·09
Weight of Firing Charge — Armour-piercing Projectile lbs.	440·9	..	200·6	104·7	39·7	154·3	282·2 249·1	388·0	200·6	..	42·5	..	388·0	337·3	203·9	149·9	42·5	32·6	..	..	..	..
Weight of Firing Charge — Common Shell "	440·9	..	..	..	..	154·3	282·2 249·1	..	200·6	..	42·5	27·1	337·3	368·2	203·9	149·9	42·5	32·6	27·1	9·9	3·6	0·79
Weight — Armour-piercing Projectile * lbs.	881·8	626·1	476·2	317·5	165·3	476·2	760·6	925·9	476·2	317·5	99·2	..	925·9	925·9	476·2	317·5	99·2	99·2	..	..	..	..
Weight — Common Shell "	881·8	..	..	..	..	396·8	630·5	771·6	396·8	264·6	99·2	66·1	771·6	771·6	396·8	264·6	99·2	99·2	66·1	30·9	17·6	5·95
Weight — Case Shot "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	130·7	130·7	61·7	39·0	19·5	7·7
Muzzle Velocity, in ft.-sec.	2625	2625	1969	2297	2625	1887	1985 1804	1969	1969	1969	1969	1969	1969	1804	1969	1969	1969	1821	1936	1673	1493	1135
Muzzle Energy — Total, in foot-tons	42139	29910	12800	11620	7894	11760	20780 17160	24900	12800	8539	2668	1777	24900	20880	12800	8539	2668	2080	..	..	..	..
Muzzle Energy — Per in. circ., foot-tons	1002	770 0	377·5	391·4	329·0	346·6	525·0 433·5	591·9	377·5	287·7	130·8	103·9	591·9	496·6	377·5	287·7	130·9	121·3	..	..	..	..
Perforation at Muzzle, inches	33·2	29·1	20·4	20·7	19·0	19·5	24·0 21·7	25·5	20·4	17·8	12·0	10·7	25·5	23·2	20·4	17·8	12·0	11·5	..	..	..	..
" " "	38·9‡	35·7‡	21·1‡	23·2	22·7‡	..	..	26·6‡	21·1‡	18·4‡	12·4‡	..	26·6	..	21·1‡	18·4‡	..	..	..	..	..	..

NOTE.—Q.F. guns are now ordered to me made for several vessels. See p. 329. * Steel or chilled iron. ‡ By Krupp's formula. There is a new model coming in, having for its largest calibre 30·5-cm. Of 40 calibres length, there have been made 30·5, 24 and 19·4-cm. guns. The 42 and 27-cm. are omitted. The 42-cm. guns of the Coast Service ships, Caiman, Indomptable, and Terrible, are to be replaced by the 30·5-cm. guns, as has been done in the Requin. There are also coming in 16·47-cm. guns, model 91, with 800-m. muzzle velocity; also of model 93, with still higher velocity.

FRENCH NAVAL ORDNANCE—*continued.*

Date and Pattern of Gun.	75–79.	Jacketed. 1870.		Jacketed. 75	Jacketed. 75	1875.				1870.				
Desig. by Calibre, in cms.	37	27	14	27 No. 1	10	42†	34	27 No. 1	10	27	24	19 long.	16	14
Calibre, in inches	14·57	10·79	5·46	10·8	3 94	16·54	13·39	10·8	3·91	10·8	9·45	7·64	6·49	5·46
Total length, in feet	36·7	17·7	10·3	19·3	9·3	32·5	22	19·3	9·3	17·7	16·21	13·6	12·2	10·3
Length of Bore, in inches	414·0	194·3	115·0	213·4	104·3	366·0	241·5	213·4	104·3	194·3	179·1	151·0	137·3	115·0
Length of Bore, in calibres	28·5	18	21	19·7	26	22	18	19·8	26	18·0	19	19·7	19	21
Number of Grooves	..	54	28	54	20	84	68	54	20	54	48	28	50	28
Depth of Grooves, inches	0·079	0·059	0·047	0·059	0·032	0·079	0·059	0·059	0·032	0·059	0·059	0·059	0·039	0·047
Rifling Twist	7°	4°	4°	4°	7°	7°	4°	4°	7°	4°	4°	4°	7°	4°
Total weight, in tons	**75·1	22·8	2·6	27·9	1·18	74·8	47·6	27·6	1·18	22·8	15·4	7·9	4·92	2·66
Weight of Firing Charge: Armour-piercing Projectile* . lbs.	463	136·7	..	165·3	..	604·1	304·2	136·7	..	92·6	62·8	33·1	39·7	..
Weight of Firing Charge: Common Shell ,,	463	126·8	11·2	145·5	10·1	..	231·5	121·3	7·1	92·6	62·8	33·1	39·7	9·0
Weight: Armour-piercing Projectile . lbs.	1235	476·2	..	476·2	..	1719·6	925·9	476·2	..	476·2	317·5	165·3	99·2	..
Weight: Common Shell ,,	1014	396·8	61.7	396·8	30·9	1433·0	771·6	396·8	26·3	396·8	264·6	137·8	99·2	46·3
Weight: Case Shot ,,	..	321·9	42·8	321·9	18·7	..	..	321·9	18·7	321·9	211·6	..	68·3	39·7
Muzzle Velocity, in ft.-sec.	1969	1608	1529	1640	1673	1663	1722	1641	1591	1424	1444	1470	1782	1332
Muzzle Energy: Total, in foot-tons	33210	8515	..	8880	..	17750	19160	8865	..	6695	4592	2477	2183	..
Muzzle Energy: Per in. circ., foot-tons	725·4	251	..	261·7	..	422	456	261	..	197·3	154·7	103·2	107	..
Perforation at Muzzle, inches	28·2	16·4	..	16·7	..	21·3	22·2	16·7	..	20·53	20·3	10·4	10·8	..

* Steel or chilled iron.

** Made at St. Chamond. The Creusôt gun weighs 71·4 tons.

GERMAN NAVAL ORDNANCE.

	Krupp Steel Breech-loading Guns, designated by calibre.																					Bronze B.L.
Designation in centimètres	30·5 jack'd.	28	28	26 long.	26 jack'd.	26 short.	24 long.	24 long.	24 long.	24 short.	21 long.	21 long.	17 long.	15 long.	15 short jack'd.	15 short.	15 short jack'd.	12·5 hoop'd.	10·5 long.	8·7	6¶	8
Calibre, in inches	12·01	11·02	11·02	10·33	10·33	10·33	9·45	9·45	9·45	9·37	8·24	8·24	6·80	5·87	5·87	5·87	5·87	4·92	3·96	3·43	2·36	3·19
Length — Total, in feet	21·98	36·75	32 15	18·77	18·77	17·06	31·50	27.56	23·63	15·45	24·0	20·61	13·94	14·67	10·73	10·73	10·68	9·60	12·08	6·89	4·1	5·15
Length — Rifled portion, in ins.	181·9	§407·9	§352·8	149·8	150·0	129·3	349·6	302·4	201·6	116·2	218·2	176·5	117·1	128·5	93·3	87·1	87·1	85·7	113·6	62·7	44·3	45·9
Length — Powder Chamber†,,	45·3			44·7	44·4	44·7	..	..	53·5	40·9	75·3	46·7	31·5	31·1	19·0	25·1	25·1	16·7	19·5	10·7	..	9·73
Length — Bore, in calibres	18·9	40	35	18·8	18·8	16·8	..	..	26·1	16·8	35·6	27·1	21·9	27·2	19·1	19·1	19·1	20·8	33·6	21·4	..	17·4
Number of Grooves	72	..	..	36	48	36	..	..	56	48	48	48	30	36	36	36	36	32	32	24	24	12
Depth of Grooves, in inches	0·079	..	..	0·077	0·079	0·077	..	..	0·059	0·061	0·059	0·059	0·063	0·059	0·061	0·061	0·061	0·059	0·049	0·049	..	0·051
Twist, in calibres	45	..	..	50	50	50	..	..	25*	45	25*	25*	45	25*	45	45	50	40*	25*	40*	..	46
Weight — Gun, including Breech Gear, tons	35·4	43·4	43·2	21·7	18·7	17·7	25·4	21·7	18·7	14·6	13·03	12·3	5·51	4·04	3·44	3·44	3·15	1·38	1·15	0·44	0·10	0·23
Weight — Breech Block, in lbs.	2954	..	..	2050	1973	1973	..	..	..	1378	831·1	908·3	496·0	390·2	324·1	324·1	324·1	163·1	149·9	86·0	..	55·1
Weight — Armour-piercing projectile,‡ in lbs.	725·3	562·2	562·2	412·3	412·3	412·3	474·0	474·0	474·0	306·4	308·6	308·6	117·9	112·4	76·1	76·1	76·1	..	..	..	..	..
Weight — Common Shell, in lbs.	725·3	474·0	474·0	357·1	357·1	357·1	474·0	474·0	474·0	261·5	308·6	308·6	112·9	112·4	65·0	65·0	65·0	40·1	39·7	14·9	6·61	8·3
Weight of Bursting Charge — Armour-piercing Shell, in lbs.	7·7	..	..	5·3	5·3	5·3	7·05	7·05	6·6	3·2	5·5	5·5	1·3	1·5	0·8	0·8	0·8	..	..	..	..	..
Weight of Bursting Charge — Common Shell, in lbs.	19·8	25·4	25·4	14·3	14·3	22·0	16·5	16·5	15·4	15·4	12·1	12·1	5·1	4·3	4·2	4·2	4·2	2·4	0·9	0·4	..	0·6
Weight of Firing Charge — Armour-piercing Shell, in lbs.	202·8	352·7	297·6	105·8	105·8	125·7	..	..	152·1	67·2	103·6	103·6	30·9	33·1	14·3	17·1	17·1	..	..	..	..	..
Weight of Firing Charge — Common Shell, in lbs.	202·8	352·7	297·6	105·8	105·8	125·7	..	..	152.1	50·7	103·6	103·6	30·9	33·1	14·3	17·1	17·1	8·8	8·8	3·3	0·88	0·9
Initial Velocity — Armour-piercing projectile, ft.-sec.	1713	2362	2133	1588	1588	1578	2067	1903	1657	1493	1739	1657	1608	1624	1463	1463	1463	..	..	..	..	..
Initial Velocity — Common shell, ft.-sec.	1713	..	..	1641	1641	1654	2067	1903	1657	1391	1739	1657	1654	1624	1555	1555	1555	1545	1526	1545	1545	1053
Muzzle Energy — Total, foot-tons	14,750	21,750	17,740	7211	7211	7119	14050	11910	9024	4736	6471	5876	2112	2055	1131	1131	1131	..	..	..	..	..
Muzzle Energy — Per in. circ., ft.-tons	391	628·4	512·4	223	223	220	473·3	401·2	304	161	250·0	227	98·9	111·5	61·3	61·3	61·3	..	..	..	..	..
Perforation at Muzzle, in ins.	20·5	‖30·7	‖26·3	15·4	15·4	15·3	‖26·8	21·0	18·1	13·0	16·4	15·6	10·3	11·0	8·0	8·0	8·0	..	..	..	..	..

NOTE.—There are also quick-firing guns; see Table of Krupp Q.F. guns. * Maximum twist. † Including taper entrance into bore.
‡ In most cases steel shells. § Length including powder chamber. ‖ Iron by Krupp's formula. ¶ Boat gun for landing and working ashore.

ITALIAN NAVAL ORDNANCE.

	Armstrong Breech Loading.				B.L.	Armstrong Muzzle Loading.							Muzzle Loading. Old Pattern.		Breech Loading.		Armstrong Quick Firing.			
Designation by Calibre, in centimètres	43·1‡ New Pattern.	43·1‡ Early Pattern. 1882.	34·3	12·0	12·0	45·0	27·9 New Pattern.	25·4 No. 1 Long.	25·4 No. 2 Short	25·4 No. 2.	22·8	20·3	16	16	7·5 No. 1.	7·5 No. 2.	15·2†	14·9	12·0*	12·0§
Calibre, in inches	17	17	13·5	4·72	4·72	17·72	11	10	10	10	9	8	6·5	6·5	3	3	6·0	5·87	4·7	4·7
Length: Total, in feet	40·75	39	36·09	8·5	9·25	32·7	14·4	14·4	14	13·8	13·8	10·8	11·8	10·6	5·8	3·3	13·8	13·87	16·2	13·0
Length: Rifled Bore, in inches	346·8	315·7	..	75	88	302	121	120	114	112	106	89	96	87	52	27	126	..	189	..
Length: Powder Chamber, in inches	84·5	98	..	10·8	22	56·5	24·5	26·0	26·0	14·0	19·5	15·7	21·3	21·3	10·2	7·9	28	..		..
Length: Bore, in Calibres	27	26	..	20·2	23·5	20·5	13·2	14·6	14·0	12·6	13·9	13·1	16·8	15·5	20·7	11·7	26	..	40	35
No. of Grooves	82	82	56	37	36	28	9	7	7	8	6	6	6	6	12	12	28	28	22	22
Twist of Rifling, in Calibres	50	50	..	40	42	50	35	40	40	55	45	45	42·5	27·3	48	48	40	40	34·4	..
Total Weight, in tons	104·3	101·5	67·9	1·20	1·38	100	25·0	18·0	18·1	12·1	12·6	6·99	5·12	3·54	0·29	0·095	4	4·2	2·05	1·69
Firing Charge: Armour-piercing projectile, lbs.	900·0	725	630·5	5·5	9·9	551	95·2	77·6		63·9	59·7	37·7	19·8	..	..	..	39·7	26·5	12·0	..
Firing Charge: Common Shell, "	600	480	..	5·5	9·9	63·0	66·6	52·9		41·9	37·7	26·7	7·3	7·1	1·9	0·7	26·5	40	12·0	..
Weight: Armour-piercing projectile, "	2000	2000	1250	52·0	52·2	2000	540·1	451·9		331·8	315·3	191·8	103·6	..	..	..	80	about 80·0	45·0	36·0
Weight: Common Shell, "	2000	2000	1250	31·7	36·8	2000	526·9	399·0		284·4	250·0	180·0	64·6	65·7	9·4	9·4	80		..	36·2
Weight: Shrapnel "	2017	2017	1250	37·3	37·37	2180	533·5	399·0		284·4	250·0	180·0	68·3	..	9·4	9·4	80		..	29·8
Weight: Case Shot "	..	..	..	32·4	35·9	..	200·1	188·1		135·6	99·6	79·4	33·1	33·1	9·0	9·0	70	..	..	..
Bursting Charge: Armour-piercing projectile, "	32	32	17·4	2·31	2·31	32 ?	15·0	12·3		8·4	6·5	3·8	..	..	..	..	1·5	..	..	1·83
Bursting Charge: Common Shell, "	60	60	87·1	2·2	2·2	78 ?	26·0	23·8		18·2	18·8	9·7	2·87	2·87	0·31	0·31	5	..	..	3·02
Bursting Charge: Shrapnel "	5	5	4·25	0·35	0·35	5 ?	2·2	2·20		1·96	1·80	1·17	0·55	..	0·03	0·03	0·16	..	..	0·35
Muzzle Velocity, in feet	1992	1935	2016	1345	1591	1700	1353	1388		1373	1284	1311	1290	1024	1335	..	1946	..	1786	..
Muzzle Energy: Total, foot-tons	55,030	51,930	35,230	650·4	916·4	40,060	6857	6035		4369	3604	2286	1195	..	..	..	2100	..	995·4	..
Muzzle Energy: Per inch circumference, foot-tons	1035	976·3	830·8	43·9	61·8	753·4	198·5	192·2		139·1	127·6	91·0	58·5	..	..	..	114·1	..	67·1	..
Perforation at Muzzle, inches of iron	33·7	32·8	30·2	6·7	8·1	28·5	14·3	14·1		12·0	11·4	9·6	7·7	..	..	..	11·2	..	8·6	..
Metal employed in structure	St.	I. & St.		St.	St.	Steel tube in Wrought Iron jacket.							I. & St.	Cast I.	Br.	Br.			St.	

St. stands for steel, I. for iron, Br. for Bronze.

* For Piemonte. † For Piemonte, Fieramosca, Re Umberto, Ancona, Doria.

‡ There are four types of these bores, viz.: types Lauria, Lepanto, Italia, Valente. § For Duilio, Dandolo, Formidabile. The Piemonte has a 40-calibre gun.

	Obuchoff Steel Breech Loading Hooped Guns.																Steel B.L. Guns.		
Designation by Calibre, in inches	12	12 Long.	12 M. 77.	11 M. 67.	11 Pattern 77.	9	*a* 9 M. 67.	*b* 9	8	8	8 M. 67.	6 Long.	6	6·03	6	Long 9-pdr.	4·2 (9-pdr.)	3·43 Long (4-pdr.)	3·43 (4-pdr.)
Calibre in centimètres	30·48	30·48	30·48	27·94	27·94	22·86	22·86	22·86	20·32	20·32	20·32	15·24	15·24	15·32	15·24	10·67	10·67	8·70	8·70
Total Length, in feet	**35	30	20	18·3	20·0	**26·25	15·0	13	**23·33	**20	14·6	**17·5	14	12·2	11·7	6·9	7·0	6·9	5·8
Length of Rifled Portion of Bore, in inches	..	..	165·0	152·0	158·0	..	124·0	..	..	..	128·0	..	118·7	106·0	98·0	61·5	65·0	62·6	53·0
Length of Powder Chamber, in inches	..	..	38·5	35·0	50·4	..	28·5	..	..	..	23·0	..	30·5	22·4	22·2	10·5	8·0	10·7	..
Length of Bore in calibres, including Powder Chamber	**35	..	17	17	18·9	**35	16·9	..	**35	**30	18·9	**35	24·9	21·3	20	17·1	17·4	21·4	..
Number of Grooves, in inches	..	..	36	36	64	..	32	32	..	..	30	..	..	24	24	24	16	24	12
Depth of Grooves "	..	0·070	0·135	0·135	0·135	..	0·110	0·110	..	..	0·090	..	0·060	0·085	0·070	0·055	0·055	0·050	0·050
Twist of Rifling in calibres	..	..	73·5	70	..	..	60	60	..	..	70	..	*24	60	68	*40	50	40	41
Total Weight, in tons	55·7	50·45	39·9	28·2	28·2	19·44	15·0	12·5	13·64	12·74	9·65	6·26	4·08	4·35	4·03	0·60	0·87	0·45	0·35
Weight of Steel Shell, in lbs.	..	..	665·8	515·9	..	..	249·1	275·6	..	..	172·0	..	90·9	97·6	86·0	..	..	..	..
Weight of Chilled Shell, "	..	731·9	665·8	515·9	562·2	..	275·6	264·7	..	193·1	169·8	..	119·0	86 0	86·0	..	..	..	..
Weight of Common Shell, "	626·4	..	639·3	496·0	520·3	268·2	266·8	266·8	192·3	172·4	172·0	73·35	..	81·6	81·6	27·6	24·2	15·2	12·6
Weight of Case Shot, "	..	..	293·2	216·1	..	..	176·4	176·4	..	..	134·5	..	..	57·3	57·3	27·6	22·3	15·2	11·0
Weight of Firing Charge. Steel Shell, "	..	..	144·4	115·3	..	..	64·2	47·0	..	..	31·5	89·38	..	14·3	18·1	..	..	..	..
Weight of Firing Charge. Chilled Shell, "	..	246·9	144·6	90·6	132·2	..	47·0	47·0	..	72·0	29·3	39·6	37·8	14·3	18·1	..	..	..	..
Weight of Firing Charge. Common Shell, "	..	..	117·3	81·6	132·2	180	42·1	42·1	88·2	72·0	28·4	39·6	..	10·8	14·3	4·5	2·6	3·1	1·3
Muzzle Velocity, in feet	..	1942	1470	1486	1516	2376	1463	1260	1925	1796	1352	2080	‡1739	1206	1463	1225	..	1444	..
Muzzle Energy. Total, foot-tons	..	19140	9974	7903	8960	10500	4095	3035	..	4321	2180	2682	1905	982	1276	..	..	..	..
Muzzle Energy. Per Inch Circumference, foot-tons	..	508·4	264·6	228·8	259·3	371·4	144·7	107·4	..	172·0	86·7	142·3	101·1	51·8	67·74	..	..	..	..
Perforation † at Muzzle, in inches	..	23·6	16·7	15·5	16·5	20·2	12·3	10·5	..	13·5	9·5	12·50	10·5	7·2	8·4	..	..	..	..

** It is doubtful if this refers to the total length of gun or of bore. * Maximum of increasing twist. † Through iron unbacked.
‡ With pyroxiline. *a* New. *b* Converted. There exist also 15 and 10·7-cm. Krupp guns.
NOTE.—The Russians certainly possess some more powerful pieces than are here shown (see p. 350).

SPANISH NAVAL ORDNANCE.

	Hontoria, Pattern 79.		Hontoria, Pattern 83.								Armstrong, Pattern 83.						Armstrong.			Krupp.				Ordonnez.	
	B.L.		Breech Loading.														Muzzle Loading.		Pattrn. 81 B.L.	Breech Loading.				B.L.	
Designation by Calibre . .	18-cm	16-cm No. 1.	32-cm.	28-cm.	24-cm.	20-cm.	18-cm	16-cm.	14-cm.	12 cm.	24-cm.	20·3-cm	15-cm.	12-cm.	8·4-cm	7·5-cm long.	22·86-cm	20·3-cm	6-in.	15-cm.	12-cm.	8·7-cm	7·5-cm	24-cm.	21-cm.
Calibre, in inches . . .	7·09	6·34	12·60	11·02	9·45	7·87	7·09	6·34	5·51	4·72	9·449	8·00	6·00	4·72	3·3	2·95	9·00	8·00	6·00	5·87	4·72	3·43	2·95	9·45	8·27
Length: Total length, in feet	15·57	13·8	38·7	33·8	29·0	..	21·75	19·3	16·91	14·5	29	18·4	17·00	13·75	7·9	7·51	13·0	11·9	14·5	17·13	11·81	6·9	6·3	..	..
Length: Rifled Portion, in inches	141·2	125·6	352·4	309·1	..	..	..	170·6	149·1	126·0	260·2	162·0	158·3	135·8	75·0	70·7	104·0	102·0	126·9	..	..	..	57·6	..	..
Length: Powder Chamber, in inches	..	31·9	86·8	77·1	..	..	..	49·8	53.9	39·4	66·9	43·5	31·4	19	13	13	..	..	29·7	..	..	..	..	35	35
Length: Bore, in calibres.	..	25	50	50	30	..	30	35	35	35	35	26	32	33	27	28·7	14	14·75	26·1	35*	30*	24*	25·8*	..	..
No. of Grooves	42	38	80	70	60	50	45	40	35	30	60	33	28	22	20	18	6	4	28	36	32	24	24	..	..
Depth of Grooves, in inches.	0·06	0·06	0·06	0·06	0·05	0·06	0·04	0·04	0·04	0·04	0·05	0·03	0·037	0·03	0·03	0·03	0·18	0·18	..	0·06	0·06	0·05	0·05	..	..
Twist of Rifling, in calibres.		Increasing from 100 to 49.	From 0 to 30.								30	45	30	40	30	35	45	40	100 to 40	25	25	40	36	24·3	16·3
Total Weight, in tons . .	7·87	5·6	48·2	32·5	20·7	11·5	8·77	6·1	4·1	2·6	21	11·5	5·0	2·2	0·45	0·35	12·5	9·0	4·0	4·6	2·1	0·49	0·30	..	..
Weight: Armour-piercing projectile, in lbs.	135·6	93·7	1041	837·8	438·7	253·5	187·4	130·1	86·0	53·1	445	180	100·0	40·0	..	..	2500	180·0	78·0	85·10	43·65	..	..	429·9	286·6
Weight: Common Shell, in lbs.	120·4	78·3	879·6	586·4	370·4	..	..	112·4	75·0	47·2	393	180	100·0	40·0	15·0	12·0	2500	180·0	83·6	65·70	34·61	14·6	9·48	..	..
Weight: Ring Segment, in lbs.	..	83·8	886·3	590·8	370·4	..	..	112·4	75·0	47·6	..	..	..	40·0	15·0	12·0	..	..	..	..	34·61	14·6	9·04	..	..
Firing Charge: Armour-piercing projectile, in lbs.	..	26·5	485·0	352·7	220·5	127·9	94·8	66·1	44·1	28·7	220	90	55·0	16·0	..	..	50·0	35·0	34·0	37·48	19·29	..	..	154·3	99·21
Firing Charge: Other projectiles	..	24·3	..	..	..	..	..	61·7	..	28·7	145	65	34·0	12·0	4·0	3·75	33·0	21·0	39·0	..	..	10·3	10·4	..	..
Muzzle Velocity, in feet .	..	1631	2034	2034	2034	..	2034	2028	2034	1988	1950	2020	2070	2000	1625	1709	..	..	1936	2001	1887	1539	1552	1772	1706
Muzzle Energy: Total, in foot-tons	..	1729	29850	2403	12580	..	5374	37·10	2466	1511	11730	5094	2972	1109	275	243	..	..	2027	2362	1076	..	..	9363	5782
Muzzle Energy: Per inch circumference, foot-tons	..	87·4	754·3	694·0	423·9	..	241·4	186·3	142·4	101·9	397·4	203·8	156·4	75·15	..	..	..	..	1075	128·1	72·6	..	..	315·4	222·6
Perforation at Muzzle, in inches	..	9·6	28·8	27·6	21·6	..	16·3	14·3	12·5	10·5	20·9	15·0	13·22	9·09	..	..	..	..	10·9	11·9	8·93	..	..	16·9	14·2
Metal and Construction .	St. & Cast I		St. Jacket and Hoops.								St.						St. and Wt. I.		St.	St.				St.	

18 and 16-cm. Palliser guns and 16 and 13-cm. Parrot guns also exist. St. stands for Steel; I. for Iron. There is also a 20-cm. (7·87-in.) B.L. Hontoria, Pattern 79, weighing 10·8 tons, firing an armour-piercing projectile weighing 180·8 lbs. with a charge of 61·73 lbs., and an Ordonnez 30·5-cm. (12·0-in.) gun, firing an 838-lb. projectile with a velocity of 1706 ft.-secs., as well as two lighter pieces.

* Total length, the length of bore not being supplied.

NAVAL ORDNANCE OF SWEDEN AND NORWAY.

	Sweden.													Norway.											
	Breech Loaders.			Model 76.		Model 81.		Model 83.		M. 85.	M. 86.	M. 89.	M.L.	Krupp, B.L.					Armstrong, M.L.				Palliser, M.L.	
Designation by Calibre, in cms.	27	24	17	27	24	27	12	15	8	25	6·5	15	12	26 No. 2.	26 No. 1.	15	12 No. 2.	12 No. 1.	26·7 No. 3.	26·7 No. 2.	26·7 No. 1.	20·2	16·7	15·5
Calibre, inches	10·80	9·45	6·58	10·80	9·45	10·80	4·72	6·00	3·31	10·00	2·60	6·0	4·80	10·24	10·24	5·91	4·72	4·72	10·51	10·51	10·51	7·94	6·58	6·11
Total Length, feet . . .	17·46	14·96	11·27	17·65	16·24	23·10	10·29	13·87	7 37	28·33	3·79	16·98	8·87	25·59	18·77	12·63	13·78	9·60	16·87	14·65	13·45	10·82	11·58	10·30
Length { Rifled Portion of Bore, ins.	160·8	137·0	107·8	159·2	150·5	191·6	94·5	124·1	71·3	2609	35·0	155·2	83·3	218·9	160·4	112·4	128·6	85·9	138·7	121·0	110·6	85·7	92·4	91·7
Length { Chamber, "	29·9	25·9	16·5	32·3	28·1	66·2	20·6	31·1	9·7	58·1	4·2	35·2	13·6	55·4	34·1	22·6	36·8	16·5	36·8	24·0	20·6	18·5	19·3	10·8
Length { Bore in calibres, "	17·2	17·1	18·7	17·8	18·9	23·9	24·0	25·7	24·3	32·9	15·4	32	20·2	30	19·0	22·8	35	25	16·7	13·8	12·5	13·2	17·0	16·8
Number of Grooves . . .	5	5	5	42	36	45	30	28	24	42	26	28	8	60	60	36	32	32	8	8	8	6	3	3
Twist of Rifling . . .	30*	30*	30*	45*	..	40*	30*	30	33*	40*	22*	30	40	∝25	45	45	∝25	40	55	55	55	50	34	34
Total Weight, tons . . .	23·6	14·4	5·2	23·6	16·4	27·1	1·9	4·2	4·2	29·8	9·4	5·2	1·9	24·8	21·7	3·9	2·31	1·38	21·7	19·7	18·2	7·4	4·9	3·4
Weight of { Armour-piercing Shell in lbs.	476·2†	317·5†	107·1†	476·2†	317·5†	476·2†	..	100·0	..	449·7	..	100	..	606·3	463·0	86·0	57·3	44·1	448·6	393·5	384·9	157·4	109·8	..
Weight of { Common Shell, in lbs.	396·8	224·9	97·7	396·8	273·4	396·8	48·5	100·0	14·8	401·2	6·2	100	34·6	606·3	381·4	69·4	57·3	36·1	316·4	316·4	316·4	153·9	82·7	59·1
Weight of Firing Charge { Armour-piercing Shell, in lbs.	83·8	59·5	22·0	90·4	56·2	206·4	..	35·3	..	242·5	..	54·0	..	191·8	99·2	22·0	19·8	9·9	110·2	82·7	66·1	29 8	22·0	..
Weight of Firing Charge { Common Shell, lbs.	83·8	59·5	22·0	90·4	56·2	145·5	16·0	35·3	3·3	242·5	0·9	..	6·6	191·8	81·6	20·9	19·8	9·9	77·2	77·2	48·5	29·8	16·5	7·72
Muzzle Velocity, feet. . .	1322	1312	1365	1378	1365	1788	1640	1663	1542	2100	1148	2067	..	1722	1575	1624	1804	1493	1549	1444	1296	1247	1329	1116
Total foot-tons	5771	3789	1384	6272	4102	10550	..	1918	..	13750	..	2964	..	12460	7966	1573	1290	680	7463	5692	4484	1696	1345	..
Muzzle Energy { Per inch Circumference.	170·1	127·6	66·9	184·9	138·2	311·3	..	101·7	..	437·7	..	157·2	..	387·4	247·7	84·7	87·1	45·9	226·0	172·4	135·8	68·0	65·1	..
Muzzle Energy { Perforation through Iron	13·19	11·4	8·3	13·8	11·9	18·4	..	10·4	..	21;9	..	13·1	..	20·4	16·2	9·5	9·7	7·0	15·5	13·4	11·8	8·3	8·2	..

Sweden.—The breech-loaders have breech screw-stoppers. The whole of the guns which do not fire shrapnel, discharge case-shot.
Norway.—Besides the chilled shell, there are also chilled solid shot for the 26·7-cm. and the 20·2-cm. guns, and for all muzzle-loaders case-shot also, and steel shrapnel for some Krupp guns.

* Maximum rate of increasing twist. † The 16·7 muzzle-loading gun fires steel solid shot.

UNITED STATES NAVAL ORDNANCE.

NATURE OF GUN.	Calibre	Weight.	Total Length.	Total Length of Bore.	Length of Rifling.	Twist of Rifling.	Length of Chamber.	Weight of Service-charge.	Weight of Projectile.	Muzzle Velocity (Service).	Muzzle Energy.	Perforation of Wrought Iron at Muzzle.†
	inch	tons.	feet.	inch.	inch.		inch.	lbs.	lbs.	ft.-seconds.	ft.-tons.	inch.
4-in. B.L.R., Mark I.	4	1·5	13·7	157·3	130·3	zero to 1 in 25	24·7	12 to 14	33	2000	915	10·1
4-in. R.F.* Gun	4	1·5	13·7	157·5	128·1	..	25·4	..	33	2000	..	10·1
5-in. B.L.R., Mark I.	5	2·8	13·5	150·3	120·8	1 in 180 to 1 in 30	27·1	26 to 29	60	2000	1,660	12·0
5-in. R.F.* Gun	5	3·1	17·4	191·5	164·4	zero to 1 in 25	32·0	28 to 30	50	2300	1,834	13·0
6-in. B.L.R., Mark I.	6	4·8	15·8	176·0	136·7	1 in 180 to 1 in 30	36·9	50	100	2000	2,773	..
6-in. B.L.R., Mark II.	6	4·9	16·1	180·1	144·9	..	32·7	45 to 48	100	2000	..	14·0
6-in. B.L.R., Mark III., of 30 Cals.	6	4·8	16·3	183·8	147·3	zero to 1 in 25	34·0	44 to 47	100	2000	..	..
6-in. B.L.R., Mark III., of 35 Cals.	6	5·2	18·8	213·8	177·3	..	34·0	..	100	2080	2,990	14·8
6-in. B.L.R., Mark III., of 40 Cals.	6	6·0	21·3	243·8	207·3	..	34·0	..	100	2150	3,204	15·6
8-in. B.L.R., Mark I.	8	{12·3 / 12·9}	21·5	239·9	195·2	1 in 180 to 1 in 30	42·1	105 to 115	250	2000	6,932	19·4
8-in. B.L.R., Mark II.	8	13·0	21·5	239·9	195·2	..	42·1	..	250	2000	..	19·4
8-in. B.L.R., Mark III., of 35 Cals.	8	13·1	25·4	290·5	242·8	zero to 1 in 25	45·1	..	250	2080	7,498	20·6
8-in. B.L.R., Mark III., of 40 Cals.	8	15·2	28·7	330·5	282·8	..	45·1	..	250	2150	8,011	21·6
10-in. B.L.R., Mark I., of 30 Cals.	10	25·7	27·4	306·3	247·3	1 in 180 to 1 in 35	57·2	225 to 240	500	2000	13,864	24·0
10-in. B.L.R., Mark I., of 35 Cals.	10	{27·1 / 28·2}	30·5	343·8	283·8	zero to 1 in 25	57·2	..	500	2060	14,720	25·8
10-in. B.L.R., Mark II., of 30 Cals.	10	25·1	27·4	307·3	247·3	zero to 1 in 26·8	57·2	..	500	2000	13,864	24·0
10-in. B.L.R., Mark II., of 35 Cals.	10	27·6	31·2	354·9	294·9	zero to 1 in 25	57·2	..	500	2100	15,285	26·6
12-in. B.L.R., Mark I.	12	45·2	36·8	419·2	343·1	..	74·1	425	850	2100	25,985	31·5
13-in. B.L.R., Mark I.	13	60·5	40·0	454·5	370·5	..	80·9	550	1100	2100	33,627	34·6

* R.F., Rapid or Quick-fire. † By Krupp's formula.

NOTE.—The weight of fixed ammunition for R.F. 4-in. and 5-in. guns is 58 and 95 lbs. respectively.
A 16-in. gun of 110 tons weight is under consideration.

ELSWICK QUICK-FIRING GUNS.

	Automatic Machine gun											Field and Naval		
Diameter of Bore, ins.	1·46	1·46	1·46	1·46	1·65	1·85	1·85	2·244	2·244	2·244	2·244	3·0	3·0	3·5
	Maxim Nordenfelt	Hotchkiss	Hotchkiss		Maxim Nordenfelt	Hotchkiss	Maxim Nordenfelt	Maxim Nordenfelt	Maxim Nordenfelt	Hotchkiss	Hotchkiss			
do. do. m.m.	37	37	37	37	42	47	47	57	57	57	57	76·2	76·2	88·9
Length of Bore, cals.	29·9	20	25	45	41·75	40	45·4	42·3	43·5	40	50	28	40	40
do. Gun, do.	..	22·7	27·8	46·7	46·2	43·6	..	..	..	43·6	53·6	29·2	41·2	41·3
Weight of Gun	lbs. 458	lbs. 73	lbs. 79	lbs. 268	lbs. 379	lbs. 506	lbs. 532	lbs. 700	lbs. 756	lbs. 800	cwts. 10	cwts. 7·5	cwts. 12·0	cwts. 24
do. Projectile, lbs.	1·0	1·1	1·1	1·5	2·5	3·3	3·3	6	6	6	6	12·5	12·5	20
do. Charge, lbs.	oz. grs 1·96	ozs 1·25	ozs. 1·25	ozs. 4·5	..	ozs. 6·8	ozs. 9·5	ozs. 12·5	lb. 1 0	ozs. 7·75	..	ozs. 13 5	lbs. 1·62	lbs. 3·75
Muzzle Velocity, f.-s.	1800	1319	1460	2300	2010	2002	2300	2300	2400	1940	2592	1585	2200	2420
Velocity at 2,500 Yards, f.-s.	600	570	595	732	896	903	966	1060	1094	966	1172	904	1084	1256
Muzzle Energy, f.-t.	22·5	13·3	18·3	55·0	70·0	91·7	121·0	220	240	156·6	279·5	217·8	419·5	812·2
Energy at 2,500 Yards, f.-t.	..	..	..	..	13·9	18·7	21·3	46·7	49 8	38·8	57·2	70·8	102	219
Penetration at Muzzle ‡ ins.	2·2	1·5	1·7	4·3	4·4	4·7	5·8	7·2	7·6	5·5	8·6	4.9	8·1	10·9
Rounds per Minute	250	..	..	25	32	30	30	28	28	25	25	20	20	15

Diameter of Bore, ins.	4		4		4·7	4·7	4·7	6	6	6	6	† 8		† 8	
do. do. m.m.	100		100		120	120	120	152	152	152	152	203		203	
Length of Bore, cals.	40		48·7		40	43·9	48·9	40	40	45	50	40		44·6	
do. Gun, do.	41·3		50		41·1	45	50	41·54	41·54	46·54	51·54	41·63		46·3	
Weight of Gun	cwts. 32		cwts. 36		cwts 42	cwts. 53	cwts. 55	tons. 5·8	tons 6·6	tons. 7	tons. 7·6	tons. 15·5		tons. 19·9	
do. Projectile, lbs.	25	30	25	30	45	45	45	100	100	100	100	210	250	210	250
do. Charge, lbs.	lbs. 5	lbs. 5	lbs. 5	lbs. 5	lbs. 5·5	lbs. 8·4	lbs. 8·4	lbs. 15	lbs. 19·5	lbs. 19·5	lbs. 19·5	lbs. 32	lbs. 32	lbs. 47	lbs. 47
Muzzle Velocity, f.-s.	2540	2325	2650	2430	2150	2570	2630	2220	2500	2570	2642	2242	2068	§2650	§2480
Velocity at 2,500 Yards, f.-s.	1251	1351	1386	1412	1275	1518	1564	1517	1706	1756	1506	1626	1582	1918	1886
Muzzle Energy, f.-t.	1118	1124	1217	1228	1442	2061	2158	3417	4334	4580	4840	7319	7413	10226	10662
Energy at 2,500 Yards, f.-t.	271	380	333	415	507	719	763	1596	2018	2138	2262	3850	4339	5357	6166
Penetration at Muzzle ‡ ins.	11·7	11·8	12·5	12·5	11·6	15·2	15·7	16·4	19·5	20·7	21·2	20·2	20·2	26·1	27·1
Rounds per Minute	15	15	15	15	10	10	10	7	7	7	7	4	3	4	3

† No cartridge case used.

‡ Worked out by compiler, on Krupp's formula. § Velocities of 2313 and 2600 f.s. are obtained with the 210 and 250 lb. projectiles, respectively, with Battering charges.

SOME RESULTS ACTUALLY OBTAINED.

4·7-inch 42 cwt. gun, with single motion breech mechanism, 5 rounds in 22 seconds, at Silloth, at a target, 2 hits, range 1,000 yards; 7 rounds in 25 seconds at drill.

6-inch Admiralty gun, with three-motion breech mechanism, and E.X.E. powder, 10 rounds in 85 seconds, at sea, on board gunboat *Kite*; 18 rounds in 3 minutes, H.M.S. *Royal Arthur*, 14 hits on target, ship steaming 8 knots, range from 1,600 to 2,200 yards; *18 rounds in 3 minutes, H.M.S. *Blake*, 15 hits on target, ship steaming 8 knots, range from 1,600 to 2,200 yards.

* Total number of rounds fired from 10 guns in same time 148, of which 110 hit the target.

6-inch 6·6-ton gun, with single motion breech mechanism, 7 rounds in 61 seconds, at Silloth, cordite charge; 4 rounds in 20 seconds, at drill.

8-inch 15·5-ton gun, with single motion breech mechanism, 3 rounds in 28 seconds, at drill; 4 rounds in 62 seconds, on board cruiser *Blanco Encalada*, ammunition supplied from magazine.

13·5-inch 68-ton B.L. gun, with hydraulic breech mechanism, 7 rounds in 12 minutes, H.M.S. *Royal Sovereign*, 6 hits on target, ship steaming 8 knots, range from 1,600 to 2,200 yards; 4 rounds in 6 minutes, H.M.S. *Empress of India*, with an interval between rounds of only 1 minute 27 seconds.

12-inch 46-ton B.L. gun, interval between 2 rounds, 1 minute 19 seconds, H.M.S. *Majestic*.

NOTE.—Although special arrangements and automatic gear are applied to heavy pieces, including the 12-in. gun, the projectiles are too heavy for rapid handling, and no piece exceeding 8 inches calibre is classed under the category of Q.F. guns at Elswick.

CANET QUICK-FIRE GUNS.

MODEL 1896.

Calibre, in centimètres	24			21			16			15			14			12			
Calibre, in inches	9·45			8·27			6·30			5·91			5·51			4·72			
Length, in calibres	40	45	50	40	45	50	45	50	60	45	50	60	45	50	60	45	50	60	80
Length, in feet	31·5	35·4	39·4	27·6	31·0	34·4	23·6	26·2	31·5	22·2	24·6	29·5	20·7	23·0	27·6	17·7	19·7	23·6	31·5
Weight of Gun, in tons	20·7	22·5	26·1	13·9	15·1	17·5	7·28	7·73	8·56	5·71	6·10	7·09	4·82	5·17	5·76	2·85	3·15	3·64	6·15
Weight of Projectile, in lbs.	330·7			242·5			101·4			88·2			70·5			46·3			
Muzzle Velocity, in ft.-secs.	2493	2625	2756	2493	2625	2756	2625	2756	2953	2625	2756	2953	2625	2756	2953	2625	2756	2953	3281
Velocity at 2000 mètres, in ft.-secs.	1969	2074	2182	1900	2001	2106	1867	1956	2103	1860	1955	2093	1818	1913	2047	1719	1811	1939	2152
Muzzle Energy, in ft.-tons	14258	15799	17418	9506	10533	11621	4846	5341	6132	4211	4645	5332	3371	3716	4265	2212	2439	2799	3455
Energy at 2000 mètres, in ft.-tons	8887	9860	10917	5517	6141	6783	2451	2716	3111	2116	2339	2679	1616	1790	2051	949	1054	1204	1487
Perforation at muzzle, in ins.*	30·3	33·8	35·4	26·0	28·1	30·2	21·1	22·8	25·3	20·4	22·0	24·5	18·7	20·1	22·3	16·1	17·4	19·3	22·6
" " " †	27·1	29·5	31·4	25·4	27·2	30·2	20·0	21·5	23·9	19·5	21·0	23·3	18·0	19·4	21·5	15·9	17·1	19·0	22·3
Perforation at 2000 mètres, in ins.*	21·1	22·8	24·7	17·4	18·5	20·0	12·5	13·5	15·0	12·0	13·0	14·2	10·6	11·5	12·7	8·4	9·1	10·1	11·9

Calibre, in centimètres	10				9			75 mm.			65			57		
Calibre, in inches	3·94				3·90			3·03			2·57			2·24		
Length, in calibres	45	50	60	80	50	60	80	50	60	80	60	70	80	60	70	80
Length, in feet	14·8	16·4	19·7	26·2	14·8	17·7	23·6	12·3	14·8	19·7	12·8	14·9	17·1	11·2	13·1	15·0
Weight of Gun, in tons	1·77	1·89	2·12	3·54	1·38	1·57	2·56	0·79	0·89	1·53	0·64	0·79	0·94	0·59	0·69	0·79
Weight of Projectile, in lbs.	28·7				22·0			13·2			8·82			6·0		
Muzzle Velocity, in ft.-secs.	2625	2723	2920	3215	2690	2887	3182	2658	2854	3150	2658	2854	3150	2625	2822	3117
Velocity at 2000 mètres, in ft.-secs.	1640	1703	1831	2011	1640	1755	1939	1496	1668	1775	1394	1496	1650	1033	1083	1171
Muzzle Energy, in ft.-tons	1369	1474	1696	2055	1107	1275	1549	648	748	910	432	498	607	284	329	401
Energy at 2000 mètres, in ft.-tons	525	576	666	804	411	471	574	205	237	289	119	137	167	44	48	57
Perforation at muzzle, in ins.*	13·7	14·9	16·1	18·7	13·2	14·7	17·1	10·8	12·0	14·0	9·3	10·4	12·1	7·8	8·8	10·2
" " " †	14·0	14·7	16·4	18·9	12·0	13·4	15·5	11·0	12·3	14·2	10·0	11·1	12·9	8·7	9·7	11·3
Perforation at 2000 mètres, in ins.*	6·7	7·0	7·9	9·1	5·7	6·8	8·0	4·4	5·0	5·8	3·4	3·9	4·4	1·9	2·0	2·3

* Through wrought iron, apparently calculated by De Marre's formula.

† Through wrought iron, by Krupp's formula, calculated by compiler.

KRUPP QUICK-FIRE GUNS.

Quick-Fire Guns of 40 and 50 calibres in length.

Calibre, in centimètres	4		4·7		5		5·3		5·7		6		7		7·5		8	
Calibre, in inches	1·57		1·85		1·97		2·09		2·24		2·36		2·76		2·95		3·15	
Total Length, in feet	5·25	6·56	6·17	7·71	6·56	8·20	6·95	8·69	7·48	9·35	7·87	9·84	9·19	11·48	9·84	12·30	10·50	13·12
Length of Bore, in inches	56·9	72·6	67·5	86·0	72·0	91·7	76·4	97·2	82·1	104·5	86·6	110·2	100·8	128·4	108·3	137·8	115·8	147·2
Length of Gun, in calibres	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50
Weight of Piece, in lbs.	216·1	238·1	352·7	388·0	423·3	467·4	504·9	555·6	628·3	692·2	731·9	806·9	1164·0	1280·9	1430·8	1576·3	1719·6	1913·6
Weight of Piece, in tons	..	..	..	..	..	..	..	..	0·28	0·31	0·33	0·36	0·52	0·57	0·64	0·70	0·77	0·85
Weight of Steel Projectile, in lbs.	1·94		3·53		3·97		4·50		5·60		6·53		10·36		12·74		15·45	
Weight of Charge, in lbs.	0·35		0·57		0·68		0·81		1·01		1·18		1·87		2·30		2·79	
Muzzle Velocity, in ft.-secs.	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493
Muzzle Energy, in foot-tons	76	83	123	135	148	162	177	194	219	241	256	281	406	447	500	549	606	666
Perforation through Steel,* in inches	3·31	3·54	3·90	4·17	4·17	4·45	4·49	4·76	4·80	5·12	5·08	5·43	5·98	6·42	6·46	6·89	7·05	7·40

Calibre, in centimetres	8·4		8·7		9		10·5		12		13		14		15		16	
Calibre, in inches	3·31		3·43		3·54		4·13		4·72		5·12		5·51		5·87		6·30	
Total Length, in feet	11·02	13·78	11·42	14·27	11·81	14·76	13·78	17·22	15·75	19·69	17·06	21·33	18·37	22·97	19·55	24·61	21·00	26·25
Length of Bore, in inches	121·9	154·9	126·4	160·6	131·1	166·5	153·6	194·9	176·4	223·7	190·2	241·4	205·4	260·5	218·4	279·0	234·5	297·5
Length of Gun, in calibres	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50
Weight of Piece, in lbs.	2010·6	2215·6	2233·3	2460·3	2473·6	2724·9	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Piece, in tons	0·90	0·99	1·00	1·10	1·10	1·22	1·64	1·87	2·35	2·68	3·12	3·54	3·88	4·41	4·70	5·35	5·88	6·69
Weight of Steel Projectile, in lbs.	17·90		19·89		22·05		30·9		44·1		58·4		72·8		88·2		110·2	
Weight of Charge, in lbs.	3·23		3·59		3·98		6·83		9·70		12·34		15·43		18·52		23·15	
Muzzle Velocity, in ft.-secs.	2379	2493	2379	2493	2379	2493	2461	2625	2461	2625	2461	2625	2461	2625	2461	2625	2461	2625
Muzzle Energy, in foot-tons	702	771	780	857	865	950	1296	1475	1851	2107	2453	2791	3055	3476	3703	4213	4628	5266
Perforation through Steel,* in inches	7·28	7·80	7·64	8·11	7·87	8·43	8·90	9·76	9·96	10·91	11·14	12·24	12·05	13·19	12·95	14·17	14·06	15·39

* Of medium hardness.

N.B.—This Table has been kindly supplied, on request, by Krupp.

Table Relating to Conversion of Measures.

Length.

Metric to English. | English to Metric.

I. Mètres.	II. Yards.	III. Feet.	IV. Inches.	V. Yards.	VI. Mètres.	VII. Feet.	VIII. Mètres.	IX. Inches.	X. Centimètres.
1	1·0936	3·2809	39·37	1	0·91438	1	0·30479	1	2·5400
2	2·1873	6·5618	78·74	2	1·82877	2	0·60959	2	5·0799
3	3·2809	9·8427	118·11	3	2·74315	3	0·91438	3	7·6199
4	4·3745	13·1236	157·48	4	3·65753	4	1·21918	4	10·1598
5	5·4682	16·4045	196·85	5	4·57192	5	1·52397	5	12·6998
6	6·5618	19·6854	236·22	6	5·48630	6	1·82877	6	15·2397
7	7·6554	22·9663	275·60	7	6·40068	7	2·13356	7	17·7797
8	8·7491	26·2472	314·97	8	7·31507	8	2·43836	8	20·3196
9	9·8427	29·5281	354·34	9	8·22945	9	2·74315	9	22·8596

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of yards	of feet	of inches	of mètres	of mètres	of centimètres
in 2354 mètres	in 12·4 mètres	in 30·5 centimètres	in 1026 yards	in 1742 feet	in 17·72 ins.
(see cols. I. & II.).	(see cols. I. & III.).	(see cols. I. & IV.).	(see cols. V. & VI.).	(see cols. VII. & VIII.).	(see cols. IX. & X.)
mètres. yards.		Note, 1 m.=100 cm.		feet. mètres.	inches. cms.
2000=2187·3	mètres. feet.		yards. mètres.	1000=304·79	10·0 =25·400
300= 328·09	10 =32·809	cms. inches.	1000=914·38	700=213·36	7·0 =17·780
50= 54·68	2 = 6·562	30·0=11·811	20= 18·29	40= 12·19	0·7 = 1·778
4= 4·37	0·4= 1·312	·5= ·197	6= 5·49	2= 0·61	·02= ·051
∴ 2354=2574·44	∴ 12·4=40·683	∴ 30·5=12·008	∴ 1026=938·16	∴ 1742=530·95	∴ 17·72=45·009

Note.—A ready way of approximately converting all French measures into English inches is to multiply by 4 and apply the decimal point by common sense—Thus for a 15-cm. gun ; 15 × 4 = 60. Now this Calibre cannot be 60 inches, nor can it be 0·6 inch ; therefore it must be 6 inches. (The exact value is 5·906 in.)

Weight.

Metric to English. | English to Metric.

I. Kilo-grammes.	II. Tons.	III. Pounds Avoirdupois.	IV. Grains Troy.	V Tons.	VI. Milliers.	VII. Pounds Avoir-dupois.	VIII. Kilo-grammes.	IX. Grains. Troy.	X. Gramme.
1	·000984	2·2046	15432·3	1	1·016	1	0·4536	1	·0648
2	·001968	4·4092	30864·7	2	2·032	2	0·9072	2	·1296
3	·002953	6·6139	46297·0	3	3·048	3	1·3608	3	·1944
4	·003937	8·8185	61729·4	4	4·064	4	1·8144	4	·2592
5	·004921	11·0231	77161·7	5	5·080	5	2·2680	5	·3240
6	·005905	13·2277	92594·1	6	6·096	6	2·7216	6	·3888
7	·006889	15·4323	108026·4	7	7·112	7	3·1751	7	·4536
8	·007874	17·6370	123458·8	8	8·128	8	3·6287	8	·5184
9	·008858	19·8416	138891·1	9	9·144	9	4·0823	9	·5832

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of tons	of pounds	of grains	of milliers	of kilogrammes	of grammes
in 35 milliers	in 56·3 kilo-	in 120 grammes	in 38 tons	in 68 pounds	in 85 grains
(see cols. I. & II.	grammes.	(see cols. I. & IV.	(see cols. V. & VI.).	(see cols. VII. & VIII).	(see cols. IX. & X.).
Note, 1000 kg.	(see cols. I. & III.).	Note, 1000 grms.			
=1 millier).	kgrms. lbs.	= 1 kg.)			
milliers. tons.	50 =110·231	grammes. grains.	tons. milliers.	lbs. kgs.	grains. grammes.
30 = 29·53	6 = 13·228	100=1543·23	30 = 30·48	60 = 27·216	80 = 5·184
5 = 4·92	0·3= ·661	20= 308·65	8 = 8·13	8 = 3·629	5 = 0·324
∴ 35 = 34·45	∴ 56·3=124·120	∴ 120=1851·88	∴ 38 = 38·61	∴ 68 = 30·845	∴ 85 = 5·508

Note.—7000 grains troy=1 pound avoirdupois.

PRESSURE.

Metric to English.			English to Metric.				Atmospheric to English.		English to Atmospheric.	
I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
Kilogrammes per square centimètre.	Pounds per square inch.	Tons per square inch.	Pounds per square inch.	Kilogrammes per square centimètre.	Tons per square inch.	Kilogrammes per square centimètre.	Atmospheres.	Tons per square inch.	Tons per square inch.	Atmospheres.
1	14·223	·00635	1	·07031	1	157·49	1	·00656	1	152.38
2	28·446	·01270	2	·14062	2	314·99	2	·01313	2	304·76
3	42·668	·01905	3	·21093	3	472·48	3	·01969	3	457·14
4	56·891	·02540	4	·28124	4	629·97	4	·02625	4	609·52
5	71·114	·03175	5	·35155	5	787·47	5	·03281	5	761·91
6	85·337	·03810	6	·42186	6	944·96	6	·03938	6	914·29
7	99·560	·04445	7	·49217	7	1102·45	7	·04594	7	1066·67
8	113·783	·05080	8	·56248	8	1259·95	8	·05250	8	1219·05
9	128·005	·05715	9	·63279	9	1417·44	9	·05906	9	1371.43

NOTE.—One atmosphere is taken to be 14·7 lbs. per square inch.

EXPLANATION.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of pounds per square inch in 32·1 kilogrammes per square centimètre (see cols. I. & II.).	of tons per square inch in 3210 kilogrammes per square centimètre (see cols. I. & III.).	of kilogrammes per square centimètre in 15 lbs. per square inch (see cols. IV. & V.).	of kilogrammes per square centimètre in 18·3 tons per square inch (see cols. VI. & VII.).	of tons per square inch in 3254 atmospheres. (see cols. VIII. & IX.).	of atmospheres in 14·6 tons per square inch (see cols. X. & XI.).
kgs. per sq. cm. = lbs. per sq. in.	kgs. per sq. cm. = tons per sq. in.	lbs. per sq. in. = kgs. per sq. cm.	tons per sq. in. = kgs. per sq. cm.	atmospheres. = tons per sq. inch.	tons per sq. in. = atmospheres.
30 = 426·68	3000 = 19·05	10 = ·7031	10 = 1574·9	3000 = 19·69	10 = 1523·8
2 = 28·45	200 = 1·27	5 = ·3516	8 = 1259·95	200 = 1·31	4 = 609·5
0·1 = 1·42	10 = ·06		0·3 = 47·25	50 = ·33	0·6 = 91·4
				4 = ·03	
32·1 = 456·55	∴ 3210 = 20·38	∴ 15 = 1·0547	∴ 18·3 = 2882·10	∴ 3254 = 21·36	∴ 14·6 = 2224·7

ENERGY.

Metric to English.		English to Metric.	
I.	II.	III.	IV.
Mètre-tons.	Foot-tons.	Foot-tons.	Mètre-tons.
1	3·2291	1	0·3097
2	6·4581	2	0·6194
3	9·6872	3	0·9291
4	12·9162	4	1·2388
5	16·1453	5	1·5484
6	19·3743	6	1·8581
7	22·6034	7	2·1678
8	25·8324	8	2·4775
9	29·0615	9	2·7872

1 mètre-ton is termed a "dinamode" in Italy.

EXPLANATION.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus find the number

of foot-tons in 4367 mètre-tons (see cols. I. & II.).	of mètre-tons in 3592 foot-tons (see cols. III. & IV.).
mètre-tons. = foot-tons.	foot-tons. = mètre-tons.
4000 = 12916·2	3000 = 929·1
300 = 968·72	500 = 154·84
60 = 193·74	90 = 27·87
7 = 22·60	2 = ·62
∴ 4367 = 14101·26	∴ 3592 = 1112·43

PERFORATION THROUGH IRON AND STEEL WITH THE FACE NOT HARDENED.

To obtain perforation through steel equivalent to a given perforation through iron, and *vice versâ*.

1 inch steel = $1\frac{1}{4}$ inches iron;

that is, 4 inches steel = 5 inches iron.

Thus, given 9·4 inches perforation through iron,

$$9{\cdot}4 \times \frac{4}{5} = 7{\cdot}52 \text{ inches steel;}$$

or, given 5·2 inches steel,

$$5{\cdot}2 \times \frac{5}{4} = 6{\cdot}5 \text{ inches iron.}$$

PART IV.

STATISTICS, OFFICIAL STATEMENTS AND PAPERS.

Statement of the First Lord of the Admiralty explanatory of the Navy Estimates for 1896-97.

[illegible]

Statement of the First Lord of the Admiralty explanatory of the Navy Estimates for 1896–97.

The Navy Estimates for 1896–97 amount to a net total of £21,823,000, or £3,122,000 more than the original estimates of 1895–96, and £4,456,900 more than those of 1894–95.

In the year 1894–95 there was in addition a Supplementary Estimate for the Navy of £200,000.

Before the close of the present financial year a Supplementary Estimate of about £1,000,000 will be presented to the House.

This great increase in the demands for the Navy, both as regards the present and the coming financial year, is due in a large measure to the acceleration of work on shipbuilding, with all the attending consequences. It has always been foreseen that the financial year 1896–97 would require a larger provision for new construction and armaments than the preceding two years of the programme initiated by Lord Spencer, but the decision of the Admiralty to hasten on the completion of ships beyond the degree originally contemplated has put a larger burden both on 1895–96 and 1896–97. The prospect of an earlier completion of ships renders an earlier delivery of guns and ammunition necessary, and thus carries with it a considerable increase in Vote 9 for armaments. An augmentation of the supply of all kinds of stores became equally imperative. As regards armour especially it has been very important to anticipate the dates of orders which were in contemplation. The progressive increase in the number of men borne, as well as in the number of ships kept in commission, is another source of expanding expenditure in every direction.

The policy of acceleration will be pursued vigorously in the year 1896–97. A considerable proportion of the increase in the Shipbuilding vote is due, not only to the number of new ships which it is proposed to build, but to the rapidity with which contractors will be called upon to complete the third-class cruisers and torpedo-boat destroyers for which they may obtain orders.

At the same time, the number of dockyard hands has been increased, and it is anticipated that they will reach the figures of 23,350 in the coming financial year.

NUMBERS.

The number of officers, seamen, boys, coastguard, and Royal Marines voted for 1895–6 was 88,850.

It is proposed to increase the numbers voted by 4,900 for the year 1896–97, making a total of 93,750.

This increase consists of:—

61 Commissioned officers.
30 Subordinate officers.
8 Warrant officers.
1,800 Seamen-class men.
342 Artisans.
2,028 Engine-room ratings.
131 Miscellaneous.
500 Royal Marines.

Notwithstanding the large increase in the entries made during the past year in various ratings, men and boys have come forward in sufficient numbers to meet the requirements of the Fleet. The full number of boys and stokers will be easily obtained before the 1st April, and the difficulty at first experienced in obtaining armourers, blacksmiths, and a few other ratings, has now practically disappeared.

Boys offered themselves in such numbers that, in order to check recruiting, it has been found necessary twice during the year to raise the standard. It was also found necessary to somewhat curtail the entry of stokers.

The experiment of training boys in a sea-going ship has been continued, and during the present financial year about 670 boys have been entered in H.M.S. Northampton.

Reports have been received from the captains of H.M. ships of the Mediterranean Fleet, to which boys passed out from the Northampton have been drafted. These reports are exceedingly satisfactory, and state that, on the whole, the boys compare well with those trained in other training ships. There has been some difficulty about their learning to swim, but steps are being taken to mitigate this as far as possible.

In order to reduce the number of boys in the training ships, without diminishing the number of entries, the course of training has been reduced from 20 to 16 months. The scheme includes a slight increase in the ages for entry, and will enable intelligent boys to attain the rating of Boy, 1st Class, at an earlier date than hitherto.

Arrangements are being made to carry out the decision of the late Government to establish a training ship at Queenstown. The Black Prince has been commissioned for the Service, and is now at Queenstown being completed. She is capable of accommodating about 450 boys.

COMMISSIONED AND WARRANT OFFICERS.

In accordance with the recommendation of the recent Committee on the Executive Lists of the Royal Navy, an increase in the authorized numbers in each rank below that of flag officer has been sanctioned, and certain changes in the rules as to promotion and retirement have been introduced.

A new scale of pay has been fixed for engineer officers, by an Order in Council of 4th July, 1895, with a view to placing the higher ranks more on an equality with the senior officers of the other civil branches of the Navy, and in order to provide adequate remuneration for their increasingly arduous and responsible duties.

The list of chief gunners, chief boatswains, chief carpenters, and warrant officers, will be further increased to meet the expansion of the Fleet. The increase will be accompanied by a revision of the rules governing their pay, promotion, and training.

Chief gunners, chief boatswains, and chief carpenters will receive an improved scale of pay ranging from 10s. to 12s. a day, and warrant officers a scale of pay ranging from 5s. 6d. to 9s. a day, besides increased store and certain other allowances. Pensions and compassionate allowances to the widows and children of officers retired with the rank of honorary lieutenant will be on the same scale as those granted in the case of junior lieutenants.

In order to meet the want of executive officers on the active list, it was decided last year to transfer 100 officers from the Mercantile Marine to a Supplementary List of the Royal Navy. Several hundreds of applications were received, and from these the full number have been selected and granted commissions. Of this number, 90 were taken from the Royal Naval Reserve; 2 were taken from the Victorian Naval Defence Force; and 8 were taken from the Mercantile Marine direct.

Of the 90 taken from the Royal Naval Reserve, 68 had either completed one or two years' training in the Royal Navy, or were undergoing such training; and 11 had undergone short courses of instruction in the gunnery or torpedo ships, or had been embarked in Her Majesty's ships for summer manœuvres.

H.M.S. "Britannia."

It is proposed to replace the Britannia by a new college for Naval Cadets, and to obtain a site for this purpose on the high ground above Dartmouth. There are most serious defects in the present ship and in the system, and the substitution of a college for a ship, which has been under discussion at various times since 1875, appears to offer many advantages.

A sloop will be provided as a tender for instruction, instead of the present vessel, which is small and unsuitable.

The Royal Marines.

The Royal Marines have sustained throughout a somewhat exceptional year their share in the manning requirements of the Fleet, with the result that their numerical strength afloat is far above the average of recent years.

During the financial year more than 1700 passed the physical test and joined the corps. The qualifying height for growing lads has stood at an average of 5 ft. 6½ in., but during the concluding months of the year men came in at the higher standards of 5 ft. 7 in. and 5 ft. 7½ in.

In the instruction of the recruit and the revising courses of the trained marine very satisfactory results have been reached. This is especially marked in the musketry practice with the Lee-Metford rifle used by the corps on shore for the first time last year. With this arm the percentage of marksmen as well as the figure of merit of the shooting generally, shows a considerable increase over previous years when armed with the Martini-Henry rifle.

Upon the question of ranges for practice with the new arm, some difficulty has been experienced, in common with the Army, to secure ground of sufficient extent to conduct the firing with safety. Consequently it has been found necessary to carry on the shooting of the Plymouth Division and Depôt (Walmer) at the Portsmouth and Chatham ranges. A suitable range at Plymouth will be provided as soon as the War Office has secured an adequate site, and the question of the Walmer range is now under consideration.

Naval gun drill qualifies Marines to take their place at any of the guns to be found in the armament of a modern battleship. The gun-drill batteries at which the men obtain their training, receive from time to time the latest types of modern ordnance.

The new quarters at Walmer constructed to give accommodation for 500 additional recruits are approaching completion.

Recruits to the number of 1285 underwent their 7 months' course of preliminary drills at this Depôt during the year.

Royal Naval Reserve.

The total number of officers now on the Active Lists who have served for 12 months' training in the Navy, or who are now under training, is 158. This is exclusive of 69 officers who have been transferred to the Supplementary List of the Royal Navy.

Provision will be made in the coming Estimates to increase the lists of lieutenants and sub-lieutenants by 50 each over the numbers provided for in last year's Estimates.

Sanction has been obtained for the additional numbers of executive officers provided for in the Estimates for 1895–6. It was found necessary to settle various questions as to age on entry and for retirement, qualifications for promotion, etc., and therefore the proposed change has only recently been carried into effect.

There are now 264 applications for commissions before the Admiralty, and there is no doubt that the numbers proposed in the Estimates for 1896–7, viz., 1300, will very soon be complete. The number of these officers will be increased gradually up to a total of 1500. The list of engineer officers will also be raised from 200 to 300.

The following changes are about to be made in the existing organisations of Royal Naval Reserve officers:—

1. The age for compulsory retirement will be for

Lieutenants...	45	instead of	55.
Sub-lieutenants	40	„	50.

2. Midshipmen, hereafter entered, who do not qualify for promotion by the time they attain 25 years of age, will be removed from the list.

3. The service rendering a lieutenant eligible for the rank of retired commander will be 10 years' seniority as a lieutenant, instead of 15.

4. The maximum age for entry will be for

Lieutenants	35	instead of	40.
Sub-lieutenants	30	„	35.
Senior engineers	45	„	50.
Engineers	35	„	40.
Assistant engineers ...	30	„	35.

5. Midshipmen who have undergone 12 months' training will in future be eligible for promotion to sub-lieutenant after 5 years' service in the Reserve, if they have obtained a chief mate's certificate, and those who have not undergone such training will in future be eligible for promotion to acting sub-lieutenant after 6 years' service in the Reserve, if they have obtained a chief mate's certificate, the latter being confirmed as sub-lieutenant on obtaining an ordinary master's certificate.

With regard to men, the lists of the first and second class and firemen are practically complete. The number of men presenting themselves for entry has been so large that strict selection has been possible.

Provision has been made in the coming Estimates to add 500 firemen, which will bring the total up to 2500.

575 men were embarked for the tactical exercises in 1895.

200 men are now constantly under training on board her Majesty's ships for 6 months, and there are plenty of volunteers for such training.

In addition to regularly performing their annual drill of 28 days, many men now volunteer for further training in the gunnery ships, and provision is made in the coming Estimates for a prolonged course of training in such ships.

Provision has been made in the Estimates for building a new battery at Lowestoft. It is considered that a battery there is desirable, in view of the very large fishing population in that immediate neighbourhood, whose wants for drill as Royal Naval Reserve men are not at present adequately provided for.

An improved armament has been settled for all the batteries, and they will be systematically re-armed. A commencement will be made with such re-arming during the coming financial year.

Mobilisation.

The torpedo school proposed for Sheerness-Chatham, when established, will add materially to the efficiency of that Port Division, and will help to supply the deficiency which exists at that port in the higher torpedo ratings. This has been much felt on occasions of mobilisation. It will also obviate the inconvenience of men having to leave their own port to qualify at Portsmouth, as has been the case heretofore. When the torpedo school is established, Sheerness-

Chatham will also be able to qualify gunners, and thus relieve the schools at Portsmouth and Devonport.

In the month of January, when there were 10 extra vessels in commission, including two first-class, three second, and three third-class cruisers, carrying relief crews or returning after being relieved, a Special Service Squadron, consisting of two first-class battleships, two first-class cruisers, and six torpedo-boat destroyers, requiring 3465 officers and men, was commissioned. Six additional torpedo-boat destroyers were also commissioned to be attached to the Channel Squadron.

The necessary crews for commissioning these vessels were drawn from active service men in the depôts in the ordinary way.

Nine torpedo-boat destroyers have been commissioned and attached to the three home ports for the instruction of seamen and engine-room ratings in the management of this class of vessel. It is intended to raise the number further.

Two sea-going cruisers, the Medea and Medusa, with reduced crews, have replaced hulks as drill ships for Royal Naval Reserve at Southampton and North Shields.

The conveyance of crews of ships re-commissioned abroad will be carried out, in all except unimportant cases, by men-of-war, the new and old crews doing duty on the way out and back. As they are organised as men-of-war fighting crews, this system adds materially to the fighting strength of the Navy.

The Channel Squadron has been strengthened by the addition of two first-class battleships, the Majestic and Magnificent.

The place of the Edgar and Spartan in the Mediterranean, which had been despatched to China in 1894–95, has been filled by two second-class cruisers. The Rupert has been stationed as port guard-ship at Gibraltar.

NEW CONSTRUCTION.

Naval Defence Act.

The comparatively small amount of shipbuilding under the Naval Defence Act carried over to the year 1895–96 has now been completed.

Shipbuilding in 1895–96.

Battleships.

The Majestic and Magnificent have both been completed, and are now employed as the two flagships of the Channel Squadron.

The Majestic was commissioned in 22 months, and the Magnificent in 24 months from the date of laying the keel.

They have been built within the designed draught, and the stability conditions have been determined by experiment to be thoroughly satisfactory. These two ships have been now two months in commission, and they are reported upon as being in all respects most efficient vessels.

This rapid completion of the Majestic and Magnificent has not interfered with the maintenance of the desired progress on other new ships building, or with keeping up the sea-going and fighting efficiency of ships in reserve and commission.

Good progress is being made on the remaining seven ships of the Majestic class, and they will, it is expected, be completed well within the time originally fixed for their completion. The Renown will be completed during the summer.

First-class Cruisers.

Good progress is being made on the first-class cruisers Powerful and Terrible, building by contract, and their delivery is expected early in the financial year, and well before the contract dates.

The four first-class cruisers of the Diadem type, approved in the Estimates for 1895–96, have been commenced. Three are building by contract, and one at Pembroke.

Second-class Cruisers.

The Talbot, Eclipse, and Minerva, building in the dockyards, will all be ready for sea in the course of the summer. Six vessels of this type, building by contract, are proceeding satisfactorily. The four second-class cruisers of the Arrogant class are all being built in the dockyards, and their construction is being satisfactorily pushed forward.

Third-class Cruisers.

The first of the new type of the third-class cruiser, the Pelorus building at Sheerness, will be ready for sea next June. The Proserpine, of the same type, is about to be commenced at Sheerness and will be ready for sea early next year.

Sloops.

The four sloops, Torch, Alert, Phœnix, and Algerine, built in the dockyards, have been completed, and are ready for service.

Torpedo-boat Destroyers.

Twenty-two destroyers are at present in commission, and the reports on their behaviour at sea have been satisfactory.

NEW SHIPBUILDING PROGRAMME.

Numbers and types of New Ships to be laid down.

In the coming financial year it is proposed to commence five battleships, four first-class cruisers, three second-class cruisers, six third-class cruisers, and twenty-eight torpedo-boat destroyers. Eight of the latter have been recently ordered, as it was urgently necessary they should be commenced without delay.

Distribution of the orders between the Dockyards and the Private Trade.

Three of the battleships, one first-class cruiser, and one third-class cruiser, will be built in the dockyards. The remainder of the vessels will be built by contract.

Remarks on the types of Vessels to be laid down.

The battleships will be improved Renowns, and will have the following principal dimensions:—

Length	390 feet.
Breadth	74 feet.
Displacement	12,900 tons.

They will be 2000 tons smaller than the Majestic, and draw about 2 feet less water. They will have the same coal endurance and rather greater speed. They will be fitted with water-tube boilers, and will consequently be able to steam further at a higher speed than the Majestic class.

The main armament will be the same as that of the Majestic class. The protective arrangements are also similar, but there will be less thickness of armour.

Cruisers.

The first-class, second-class, and third-class cruisers will be of the Diadem, Talbot, and Pelorus types respectively, all of which have been described in previous Parliamentary statements.

Summary of New Construction.

From the preceding statement it will be seen that in the course of the financial year 1896–97 the following vessels will be under construction:—

Thirteen first-class battleships.
Ten first-class cruisers.
Sixteen second-class cruisers.
Seven third-class cruisers.
Forty-eight torpedo-boat destroyers.

Reconstruction and Repairs.

By the end of the present financial year the following ships will have been repaired and refitted at the home yards:—

Battleships—

Sanspareil.
Sultan.
Monarch.

Cruisers—

Blake.	Champion.
Narcissus.	Curaçoa.
Immortalité.	Cleopatra.
Severn.	Blanche.
Sirius.	Melpomene.
Phæton.	Pallas.
Cordelia.	Racer.
Comus.	

In addition there has been a large amount of work on torpedo-boat destroyers and other small vessels besides the usual annual refits of the Channel, Training, and Reserve Squadrons, and Port Guardships.

The work of foreign yards has also been considerable, and will be still larger during the next financial year, owing to an unusual number of vessels coming in hand for re-commissioning and refit.

The home yards will be similarly pressed in 1896–97, as about 21 old vessels will come into dockyard hands.

Boilers and Machinery.

During the year 1895–6 the new battleships Majestic and Magnificent, the latter with induced draught and open stokeholds, and also the battleship Sultan, after being refitted with new engines and boilers, have successfully passed through their contract steam trials.

Fifteen of the torpedo-boat destroyers by seven different contractors have also satisfactorily passed through their steam trials since April 1, 1895, and have realised the contract speed in each case. The small tube water-tube boilers in these vessels are all of British manufacture, and with the exception of one type, are of British design. Four more of these vessels will probably be tried and accepted before the end of the present financial year.

The first-class cruiser, Blake, has been refitted in her machinery department after serving a full commission in the West Indies, and has been tested under steam to the full extent of the original contract conditions for her machinery, with very satisfactory results.

The Sharpshooter has completed, with very good results, an extensive series of steam trials made to thoroughly test the Belleville boilers, and she is now employed as an instructional vessel for engine-room ratings. A Parliamentary Return has been prepared giving the results of the trials.

Armour-plate Experiments and Manufacture.

During the year various experimental armour plates have been submitted for purpose of trial. None of these, however, have as yet shown qualities equal to those possessed by the Harveyed steel armour at present used. Consequently, armour of that description is still being contracted for.

Dockyard Administration.

Certain grievances of which the dockyard workmen had complained in their recent annual petitions have been under consideration, and it is hoped that means will be found to meet some of them in the coming financial year.

Naval Ordnance.

The increase in the number of ships in construction and in commission, and the increased cost of modern guns and ammunition necessitate a very considerable increase in the vote for armaments.

The 12-in. wire guns are now mounted in two battleships, and good progress has been made with those intended for the others.

The 9·2 inch guns for the Powerful and Terrible have been successfully tried.

The conversion of breech-loading guns to quick-firers has been carried on through the year, and several ships are now provided with these guns.

It is proposed to re-arm, during 1896–97, some of the older ships with a certain number of quick-firing guns.

NEW WORKS.

New Works in the Estimates.

The principal new works for which provision is made in the Estimates of 1896–97 are :—

At Portsmouth, the reconstruction of the north railway jetty and the commencement of a new boiler shop.

At Devonport, the enlargement of No. 2 Dock and the construction of a new machine shop.

At Sheerness, the provision of buildings for a new torpedo school.

Sums are also provided for preliminary expenses in connection with the provision of new docks at the Cape of Good Hope and Mauritius.

Items are also included for improvements at Haulbowline and Pembroke Dockyards.

Works in Progress.

At Portsmouth, two new jetties are in hand which will afford additional accommodation for berthing deep draught vessels.

The new electric shop has been commenced and will be completed during 1896.

At Gosport, a new jetty to replace the old one, which has become unsafe, has been begun.

At Malta, the new boiler shop and coal store are being advanced, but will not be completed until 1897–98.

Works are in hand at Jamaica and Simon's Town for improving the water supply to the Naval Establishments.

Improvements are being effected in the Rifle Ranges at Devonport, Walmer, and Sheerness, to allow of the use of the Magazine Rifle; work at Malta Range will be completed this year.

The new coaling arrangements at Portland are practically completed.

The work of providing buildings for the new Gunnery School at Sheerness is progressing.

Progress under Naval Works Act, 1895.

The progress made on the works entered in the schedule of the Naval Works Act, 1895, is as follows :—

(*a.*)—*Inclosure and Defence of Harbours.*

Gibraltar.—The completion of the present mole is being carried out by contract, and a length of about 530 feet has been brought up to the level of low water.

The extension of the present mole and the construction of the detached mole are being carried out directly by the Admiralty. The supply of material and plant from England and the necessary preliminary operations have occupied some time, but the work of construction has now been begun and will be pushed forward rapidly.

The "St. Lawrence" dredger arrived at Gibraltar in September, and is working on the area to be dredged.

No work has been commenced on the Dolphins, which will not be required if a commercial coaling mole, now under consideration, is undertaken.

Portland Breakwater.—The line of Dolphins is completed, and the Bincleave Groyne has been brought up to low-water level.

Dover Breakwater.—An arrangement has been made with Messrs. Coode, Son, and Matthews, under which they have been appointed the engineers to prepare the necessary plans and estimates, and to carry out the works under the Admiralty Civil Engineer-in-Chief. The survey is being pressed on with all speed, but owing to the magnitude of the work it is not probable that the plans will be ready before September next.

(*b.*)—*Adapting Naval Ports.*

Deepening harbours and approaches:—

Portsmouth.—The dredging of the bar has been completed, and berths for five battleships will be finished by the 31st March next.

Devonport.—The dredging of the Sound and Hamoaze will be completed this month (February), except certain patches in the Sound and the portion in the Hamoaze adjacent to the new works; the Vanguard and Cremyll Shoals will be completed in August, 1897, and the Rubble Bank in May, 1898. These works are being done by contract.

Chatham.—The widening and deepening of the new channel of the River Medway will be completed in April.

Haulbowline.—The dredging to improve the basin entrance will be completed about June next.

Keyham Dockyard Extension.—A tender for the main works was accepted on the 2nd January, and the work will be proceeded with at once.

Portsmouth Docks.—Good progress has been made with these docks, which it is now expected will be completed in December, 1896, and March, 1897, respectively, instead of in July, 1898, the date originally fixed.

Gibraltar Dock.—The excavation of the New Mole Parade has been carried down to a level of 12 feet above the general level of the Dockyard.

Hong Kong Dockyard Extension.—This work has been delayed owing to a difference with the Colonial Authorities, which has now been overcome. The work will be at once commenced.

(*c.*)—*Naval Barracks, &c.*

Chatham.—The plans are being completed, and arrangements have been concluded with the War Office for handing over the additional land required.

Portsmouth.—The new Naval Barracks will occupy the site of the Anglesea Barracks, and the date for vacating these barracks is under consideration with the War Office.

Walmer.—The new barrack blocks will be ready by the 31st March next.

Keyham Engineers' College.—This work was commenced by contract the 30th August, 1895, and will be completed the 30th November, 1896.

ADDITIONAL WORKS TO BE PROVIDED FOR BY BILL.

Provision will be made in the Naval Works Bill, 1896, for the continuation of the works contained in the Schedule of the Naval Works Act, 1895, and the following new works will be included for the first time:—

Gibraltar.—It is proposed to increase the length of the dock already begun to 700 feet, so as to form a double dock, if necessary, and to build two additional docks, with a length of 500 and 600 feet respectively. The width of the dock entrances will be 95 feet, and the depth over sill 33 feet. For the new dockyard some 50 acres of foreshore and water area will be reclaimed, and a deep-water wharf wall and a torpedo-boat camber will be built. Additional coaling stores will be provided on the Admiralty Mole.

Keyham Naval Barracks.—Provision is made for the extension of these barracks, so as to provide accommodation for 2000 officers and men in all, the existing buildings having been proved insufficient for the needs of the Service.

Chatham Naval Hospital.—It is proposed to build a new Hospital with 600 beds. The existing building, besides being too small, is obsolete in design and defective in construction. In particular there is no provision for the isolation of infectious cases, and no wards arranged for the reception of seriously injured patients. The grounds in which the Hospital stands are very limited, and do not admit of any extension of the present buildings.

Magazines at Home and Foreign Ports.—Provision is also made in the Bill for completing the Magazines now being constructed by the War Office for the Admiralty at Gibraltar and Malta, and for further Magazine accommodation at the Home Ports.

Dartmouth.—H.M.S. *Britannia.*—It is proposed to replace the Britannia by a college, to be built on the high land above Dartmouth.

In view of the magnitude and importance of the works included in the Schedule of the Naval Works Act, a separate department has been formed at the Admiralty to superintend their execution, and Major Pilkington, R.E., C.B., the late Director of Works, has been appointed Civil Engineer-in-Chief in charge of this department. Major Raban, R.E., late Superintending Civil Engineer at Portsmouth, has been appointed Director of Works.

GEORGE J. GOSCHEN.

26*th February*, 1896.

Abstract of Navy Estimates for 1896-97.

Votes.		Estimates, 1896-97. Gross Estimate.	Appropriations in Aid.	Net Estimate.	Estimates, 1895-96. Gross Estimate.	Appropriations in Aid.	Net Estimate.	Difference on Net Estimates. Increase.	Decrease.	Votes.
	I.—NUMBERS.			Total Numbers.			Total Numbers.	Numbers.	Numbers.	
A.	Total Number of Officers, Seamen, Boys, Coast Guard, and Royal Marines	....	....	93,750	....	....	88,850	4,900	....	A.
	II.—EFFECTIVE SERVICES.	£	£	£	£	£	£	£	£	
1	Wages, &c., of Officers, Seamen and Boys, Coast Guard, and Royal Marines	4,536,100	116,300	4,419,800	4,262,383	128,883	4,133,500	286,300	....	1
2	Victualling and Clothing for the Navy	1,800,544	430,944	1,369,600	1,738,754	371,654	1,367,100	2,500	....	2
3	Medical Establishments and Services	180,382	24,182	156,200	175,731	24,331	151,400	4,800	....	3
4	Martial Law	10,630	30	10,600	10,627	27	10,600	....	....	4
5	Educational Services	111,578	30,278	81,300	106,727	27,327	79,400	1,900	....	5
6	Scientific Services	74,180	10,880	63,300	72,197	10,797	61,400	1,900	....	6
7	Royal Naval Reserves	229,911	111	229,800	215,633	33	215,600	14,200	....	7
8	Shipbuilding, Repairs, Maintenance, &c.:									8
	Section I.—Personnel	2,116,915	12,915	2,104,000	1,824,995	14,995	1,810,000	294,000	....	Sec. I.
	Section II.—Matériel	2,387,000	136,000	2,251,000	2,803,000	148,000	2,655,000	....	404,000	Sec. II.
	Section III.—Contract Work	5,423,480	37,480	5,386,000	3,455,640	39,640	3,416,000	1,970,000	....	Sec. III.
9	Naval Armaments	2,600,855	57,655	2,543,200	1,742,711	49,511	1,693,200	850,000	....	9
10	Works, Buildings, and Repairs at Home and Abroad	624,900	6,500	618,400	554,500	7,500	547,000	71,400	....	10
11	Miscellaneous Effective Services	198,746	9,546	189,200	186,514	9,714	176,800	12,400	....	11
12	Admiralty Office	245,560	8,760	236,800	245,720	8,520	237,200	....	400	12
	Total Effective Services . £	20,540,781	881,581	19,659,200	17,395,132	840,932	16,554,200	3,509,400	404,400	
	III.—NON-EFFECTIVE SERVICES.									
13	Half-Pay, Reserved, and Retired Pay.	761,258	12,258	749,000	774,276	12,976	761,300	....	12,300	13
14	Naval and Marine Pensions, Gratuities, and Compassionate Allowances	1,052,090	21,990	1,030,100	1,031,327	23,427	1,007,900	22,200	....	14
15	Civil Pensions and Gratuities	324,889	489	324,400	317,786	486	317,300	7,100	....	15
	Total Non-Effective Services . £	2,138,237	34,737	2,103,500	2,123,389	36,889	2,086,500	29,300	12,300	
	IV.—EXTRA ESTIMATE FOR SERVICES IN CONNECTION WITH THE COLONIES.									
16	Additional Naval Force for Service in Australasian Waters—Annuity payable under	95,300	35,000	60,300	95,300	35,000	60,300	....	....	16
	GRAND TOTAL . £	22,774,318	951,318	21,823,000	19,613,821	912,821	18,701,000	3,538,700	416,700	

Net Increase £3,122,000

STATEMENT showing the Actual and Estimated EXPENDITURE for NAVAL SERVICES for the Three Years ending the 31st March 1897.

		£	s.	d.
1894–95	Estimated Expenditure (after deducting Interest on Advances under Naval Defence Act, 1889, and Appropriations in Aid)	17,295,464	0	0
	Supplementary Estimate (2nd March 1895)	200,000	0	0
	To be withdrawn from the Naval Defence Fund	223,991	0	0
		17,719,455	0	0
	Net Expenditure, as per Final Account	17,642,424	0	0
	Net (Expenditure less than Estimate)	£77,031	0	0
1895–96	Estimated Expenditure (after deducting Appropriations in Aid)	£18,701,000	0	0
1896–97	Estimated Expenditure (after deducting Appropriations in Aid)	£21,823,000	0	0

STATEMENT of the Principal Points of DIFFERENCE between the ESTIMATES of 1895–96 and those for 1896–97.

		£
INCREASES.		
Wages, &c., of Officers, Seamen, and Marines		281,500
Medical Establishments and Services		4,700
Royal Naval Reserves		14,200
Wages of Artificers, &c., in Dockyards at Home and Abroad		291,696
Decrease in amount of Receipts arising from the Sale of Unserviceable Stores and Old Machinery		5,000
Machinery for Her Majesty's Ships (Contract) (Net)		1,142,532
Hulls of Ships (Contract)		737,046
Inspection of Contract Work		10,000
Gun Mountings and Air Compressing Machinery (Contract)		59,075
Machinery for Shore Establishments (Contract)		14,000
Royal Reserve of Merchant Cruisers		3,147
Wages of Artificers employed in Naval Ordnance Establishments		5,159
Guns, Projectiles, Ammunition, Torpedoes, Guncotton, Small Arms, and Miscellaneous Stores, &c.		849,850
Works, Buildings, and Repairs		71,400
Passage Money		9,600
Non-Effective Services		14,950
Decrease in amount of Contribution from Indian Government on account of Her Majesty's Ships in Indian Waters		17,000
Miscellaneous Items		8,369
DECREASES.	£	3,539,174
Naval Stores	407,174	
Increase in amount of Receipts arising from the Sale of Obsolete and Unserviceable Naval Armament Stores	10,000	
		417,174
Net Increase		£3,122,000

STATEMENT showing the Total Estimated EXPENDITURE for the NAVAL SERVICE, including Amounts provided in the NAVY ESTIMATES, as well as in the CIVIL SERVICE and other ESTIMATES, for the following Services:—

——		1896–97.	1895–96.
NAVY ESTIMATES:		£	£
Estimated Expenditure (after deducting Appropriations in Aid)		21,823,000	18,701,000
CIVIL SERVICE ESTIMATES:			
Estimated Expenditure under—			
Class I. Vote 4.—Admiralty, Extension of Buildings (Net)		25,000	24,200
,, I. ,, 9.—Public Buildings, Great Britain:	£		
Maintenance and Repairs, including New Works, Alterations, &c. . . .	3,500		
Rents, Insurance, Tithes, &c. .	5,000		
Fuel, Light, Water, &c.	3,800		
Furniture . .	1,200		
		13,500	12,730
Class I. Vote 10.—Surveys of the United Kingdom		100	100
,, I. ,, 13.—Rates on Government Property		69,200	59,800
,, I. ,, 14.—Public Buildings, Ireland:			
Coast Guard, viz.:	£		
Purchase of Sites .	—		
New Works and Alterations, including Naval Reserve Stations . .	8,702		
Maintenance and Supplies .	6,399		
Furniture, Fittings, &c.	7		
	£15,108		
Naval Reserve, viz.:			
Maintenance and Supplies .	197		
		15,305	15,227
Class II. Vote 8.—Board of Trade:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force . .		3,600	3,450
Class II. Vote 14.—Exchequer and Audit Department (Cost of Audit):	£		
Navy Cash Accounts	7,451		
Expense and Manufacturing Accounts . .	4,498		
Store Accounts .	5,369		
		17,318	17,365
Class II. Vote 23.—Stationery and Printing . .		70,000	63,000
,, III. ,, 1.—Law Charges, England (Net) .		2,425	3,348
,, III. ,, 8.—Prisons, England and the Colonies:			
Maintenance of Naval Prisoners		1,754	1,395
,, III. ,, 14.—Prisons, Scotland . . .		67	48
,, III. ,, 21.—Prisons, Ireland . . .		44	48
REVENUE DEPARTMENTS:			
Post Office.—Postage of Official Correspondence (including Parcels) . .	£ 12,170		
,, Official Telegrams . .	3,138		
		15,308	15,010
Total . . . . £		22,056,621	18,916,721

VOTE (A.)

NUMBERS

Of all Ranks for whom Provision is made in the Navy Estimates 1896–97.

I.—Available for Sea Service . . .	85,818	93,750
II.—Other Services	7,932	

Ninety-three Thousand Seven Hundred and Fifty.

I.—Available for Sea Service.

Under which Vote Provided.	Ranks, &c.	Numbers, all Ranks. 1896–97.		Numbers, all Ranks. 1895–96.		Average Numbers of all Ranks borne during the Year 1895.
	For Her Majesty's Fleet (including Indian Troop Ship).					
Vote 1	Flag Officers	14		14		
	Commissioned Officers . .	3,132		3,073		
	Subordinate Officers . . .	588		568		
	Warrant Officers . . .	1,108		1,101		
	Petty Officers and Seamen . .	56,420		51,995		
	Boys.	4,495	65,757	5,194	61,945	59,174
	Coast Guard.					
	Commissioned Officers . .	90		89		
	Chief Officers of Stations . .	231		231		
	Petty Officers and Seamen . .	3,879	4,200	3,880	4,200	4,091
	Royal Marines (for Service Afloat and on Shore).					
	Commissioned Officers . .	390		358		
	Warrant Officers . . .	28		28		
	Staff Sergeants and Sergeants .	1,194		1,173		
	Buglers and Musicians . .	568		602		
	Rank and File	13,681	15,861	13,202	15,363	15,295
	Total numbers available for Sea Service . . .		85,818		81,508	78,560

Net Increase in Numbers 4,310

II.—Other Services.

Under which Vote Provided.	Ranks, &c.	1896–97.		1895–96.		Average 1895.
Vote 1	Naval Cadets	280		280		
	Engineer Students . . .	182		172		
	Pensioners in Home Ships and in the Reserves	1,121		1,290		
	Boys under Training . . .	5,300	6,883	4,600	6,342	5,009
Other Votes	Various Services . . .	..	1,049	..	1,000	1,000
	Total numbers for other Services		(a)7,932		(a)7,342	6,009

Net Increase in Numbers 590

(a) Including Officers and Seamen . . .	2,488	—	2,599
,, Boys	5,300	—	4,601
,, Royal Marines . . .	144	—	142
	7,932	—	7,342

VOTE 8.

SHIPBUILDING, REPAIRS, MAINTENANCE, &c.

I.—ESTIMATE of the SUM which will be required, in the YEAR ending 31st March, 1897, to defray the EXPENSES of SHIPBUILDING, REPAIRS, MAINTENANCE, &c., including the COST of ESTABLISHMENTS of DOCKYARDS and NAVAL YARDS at HOME and ABROAD.

DOCKYARD WORK.

SECTION I.—PERSONNEL.—Two Million One Hundred and Four Thousand Pounds.
(£2,104,000.)

SECTION II.—MATÉRIEL.—Two Million Two Hundred and Fifty-one Thousand Pounds.
(£2,251,000.)

CONTRACT WORK.

SECTION III.—CONTRACT WORK.—Five Million Three Hundred and Eighty-six Thousand Pounds.
(£5,386,000.)

—SUB-HEADS under which SECTION I., PERSONNEL, of this VOTE will be accounted for.

	ESTIMATES. 1896-97.	ESTIMATES. 1895-96.	Increase.	Decrease.
	£	£	£	£
DOCKYARD WORK.				
SECTION I.—PERSONNEL.				
Dockyards at Home.				
A.—Salaries and Allowances	157,115*	159,418	..	2,303
B.—Wages, &c., of Men, and hire of Teams	1,680,343	1,394,522	285,821	..
C.—Wages, &c., of Police Force	37,853	38,062	..	209
D.—Contingencies	5,330	5,200	130	..
Naval Yards Abroad.				
E.—Salaries and Allowances	54,701*	52,272	2,429	..
F.—Wages, &c., of Men, and hire of Teams	170,353	164,478	5,875	..
G.—Wages, &c., of Police Force	10,290	10,113	177	..
H.—Contingencies	930	930	..	..
£	2,116,915	1,824,995	294,432	2,512
Deduct,— I.—Appropriations in Aid	12,915	14,995	..	2,080
£	2,104,000	1,810,000	294,432	432
	Net Increase		£294,000	

* These amounts include the sums of £9,657 and £1,097 for pay of Inspectors of Shipwrights at Home and Abroad respectively, which is charged direct to the cost of shipbuilding.

NOTE.—Provision has been made for New Construction in the above Vote to the extent of—

Section 1	£1,081,700
" 2	1,130,900
" 3	5,022,274
	£7,234,874

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION II., MATÉRIEL, of this VOTE will be accounted for.

——	ESTIMATES. 1896–97.	ESTIMATES. 1895–96.	Increase.	Decrease.
	£	£	£	£
DOCKYARD WORK—*continued.*				
SECTION II.—MATÉRIEL.				
Naval Stores.				
A.—Timber, Masts, Deals, &c. . .	130,000	152,000	..	22,000
B.—Metals and Metal Articles . .	1,149,000	1,427,174	..	278,174
C.—Coals for Yard purposes . . .	53,000	58,000	..	5,000
D.—Hemp, Canvas, &c.	112,000	165,000	..	53,000
E.—Paint Materials, Oils, Pitch, Tar, Tallow, Boats, Furniture, and other Miscellaneous Articles. . .	290,000	360,000	..	70,000
F.—Electrical, Torpedo, and other Apparatus	90,000	100,000	..	10,000
G.—Coals for Steam Vessels . . .	500,000	475,000	25,000	..
H.—Freight.	35,000	35,000	..	..
I.—Rents, Water, &c., Dockyards at Home, and Naval Yards Abroad . .	18,905	18,811	94	..
K.—Gas, &c., Dockyards at Home, and Naval Yards Abroad . . .	9,095	12,015	..	2,920
£	2,387,000	2,803,000	25,094	441,094
Deduct,—				
L.—Appropriations in Aid . . .	136,000	148,000	..	12,000
£	2,251,000	2,655,000	25,094	429,094
	Net Decrease *		. £404,000	

* This Vote is decreased by a transfer of £3,220 to Vote 2. The real decrease is, therefore, £400,78?.

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION III., CONTRACT WORK, of this VOTE will be accounted for.

	ESTIMATES.		Increase.	Decrease.
	1896-97.	1895-96.		
	£	£	£	£
SECTION III.—CONTRACT WORK.				
A.—Propelling Machinery for Her Majesty's Ships and Vessels	2,332,380	1,186,685	1,145,695	
B.—Auxiliary Machinery for Her Majesty's Ships and Vessels	42,412	45,575	..	3,163
C.—Hulls of Ships, &c., Building by Contract	2,347,580	1,610,534	737,046	..
D.—Purchase of Ships, Vessels, &c.	..	..	..	..
E.—Repairs and Alterations by Contract of Ships, &c., and their Machinery and Stores	77,230	75,190	2,040	..
F.—Inspection of Contract Work	45,000	35,000	10,000	..
G.—Gun Mountings and Air Compressing Machinery	471,258	412,183	59,075	..
H.—Machinery for Her Majesty's Shore Establishments at Home and Abroad	59,000	45,000	14,000	..
I.—Royal Reserve of Merchant Cruisers	48,620	45,473	3,147	..
£	5,423,480	3,455,640	1,971,003	3,163
Deduct,—				
K.—Appropriations in Aid	37,480	39,640	..	2,160
£	5,386,000	3,416,000	1,971,003	1,003
	Net Increase . . £1,970,000			

PROGRAMME of the ESTIMATED EXPENDITURE in CASH, and in NET VALUES OF STORES issued for SHIPBUILDING, RE-CONSTRUCTION, REPAIRS, MAINTENANCE, &c., in the Year 1896–97.

SUB-HEADS under which this ESTIMATED EXPENDITURE will be accounted for in the NAVY EXPENSE ACCOUNTS, under the provisions of Sec. 1 (2), ARMY AND NAVY AUDIT ACT, 1889.

	ESTIMATES,				1896–97.		1895–96.			Difference between Direct Expenditure, 1895–96 (B) and 1896–97 (A).	
	Direct Expenditure.										
	Dockyard Work.		Contract Work, Sec. III.	Total Direct Expenditure. (A)	Establishment, &c., Charges, apportioned.	Aggregate, 1896–97.	Direct Expenditure. (B)	Establishment, &c., Charges, apportioned.	Aggregate, 1895–96.	Increase.	Decrease.
	Personnel, Sec. I.	Matériel, Sec. II.									
	£	£	£	£	£	£	£	£	£	£	£
NEW CONSTRUCTION:											
A.—DOCKYARD-BUILT SHIPS—											
Hulls, &c. (c)	964,165	1,199,450	270,504	2,434,119	280,428	2,714,547	2,385,660	255,231	2,640,891	48,459	..
Machinery	40,005	23,650	495,703	559,358	17,543	576,901	449,126	21,328	470,454	110,232	..
	1,004,170	**1,223,100**	**766,207**	**2,993,477**	**297,971**	**3,291,448**					
B.—CONTRACT-BUILT SHIPS—											
Hulls, &c. (c)	73,530	54,800	2,489,266	2,617,596	56,973	2,674,569	1,752,473	44,075	1,796,548	865,123	..
Machinery	..	..	1,705,518	1,705,518	24,932	1,730,450	783,493	15,356	798,849	922,025	..
	73,530	**54,800**	**4,194,784**	**4,323,114**	**81,905**	**4,405,019**					
C.—SMALL VESSELS (d)	4,000	3,000	61,283	68,283	896	69,179	22,890	388	23,278	45,393	..
TOTAL NEW CONSTRUCTION	**1,081,700**	**1,280,900**	**5,022,274**	**7,384,874**	**380,772**	**7,765,646**	**5,393,642**	**336,378**	**5,730,020**	**1,991,232**	
D.—RE-CONSTRUCTION, REPAIRS, ALTERATIONS, &c.	..	..	..	903,607	88,147	991,754	733,249	73,789	807,038	170,358	..
E.—SEA STORES, COALS, &c.	..	..	..	1,029,482	45,732	1,075,214	1,004,482	41,543	1,046,025	25,000	..
F.—ESTABLISHMENT, INCIDENTAL, AND MISCELLANEOUS CHARGES, UNAPPROPRIATED	..	..	..	..	1,039,305	1,039,305	..	982,385	982,385	..	..
				9,317,963	**1,553,956**	**10,871,919**	**7,131,373**	**1,434,095**	**8,565,468**		

NET INCREASE ON DIRECT EXPENDITURE . . £2,186,590.

(c) Including Hydraulic and Transferable Gun Mountings, &c.
(d) Including Harbour Craft, and excluding Torpedo Boats, &c., the value of which is included under Sub-Heads A, B, and D.

RECAPITULATION OF ESTIMATED EXPENDITURE.

HEADS OF EXPENDITURE.	ESTIMATED EXPENDITURE.		ESTIMATED DISTRIBUTION OF THE DIRECT AND INCIDENTAL EXPENDITURE.							
			Naval Construction.					Establishment and Incidental Charges Unapportioned to Ships, &c.		
				Re-construction, Repairs, Alterations, and Refits.						
	Charged direct as Incurred.	Establishment and Incidental Charges Apportioned.	New Construction.	Ships Re-constructing.	Ships for Reliefs, or Re-commission.	Ships in Commission and Reserve.	Stores for Ships, Coals for Steaming, &c.	Fleet, Port, National, and Unappropriated Charges.	Unappropriated Charges (Haulbowline, Deptford, and Naval Yards Abroad).	Total Amount of Estimated Expenditure.
	(a.)	(b.)	(c.)	(d.)	(e.)	(f.)	(g.)	(h.)	(i.)	(k.)
SUB-HEADS OF EXPENDITURE.			A., B., and C.	D.			E.	F.		
	£	£	£	£	£	£	£	£	£	£
SECTION I.—DOCKYARD WORK. PERSONNEL .	1,496,040	798,692	1,271,025	..	190,869	274,822	32,061	358,023	167,932	2,294,732
SECTION II.—DOCKYARD WORK. MATÉRIEL .	2,530,580	570,622	1,398,910	..	108,129	161,762	1,026,671	232,637	226,748	3,101,202
SECTION III.—CONTRACT WORK . .	5,291,343	184,642	5,095,711	..	74,252	181,920	16,482	53,965	..	5,475,985
TOTAL ESTIMATED EXPENDITURE for 1896–97 . . . . . . £	9,317,963	1,553,956	7,765,646	..	373,250	618,504	1,075,214	644,625	394,680	10,871,919
TOTALS OF SUB-HEADS £	10,871,919		7,765,646	991,754			1,075,214	1,039,305		10,871,919

LIST of NEW SHIPS and VESSELS Estimated to be passed into the FLEET RESERVE during the Years 1896–97 and 1895–96.

1896–97.				1895–96.			
Name of Ship.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.	Name of Ship.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.
ARMOURED SHIPS:				**ARMOURED SHIPS:**			
Renown	12,350	10,000	14	Magnificent	14,900	10,000	16
Prince George	14,900	10,000	16	Majestic	14,900	10,000	16
Victorious	14,900	10,000	16				
PROTECTED SHIPS:				**PROTECTED SHIPS:**			
Talbot	5,600	8,000	11				
Eclipse	5,600	8,000	11				
Minerva	5,600	8,000	11				
Arrogant	5,800	10,000	10				
Powerful	14,200	25,000	14	Nil			
Terrible	14,200	25,000	14				
Juno	5,600	8,000	11				
Doris	5,600	8,000	11				
Venus	5,600	8,000	11				
Diana	5,600	8,000	11				
UNPROTECTED SHIPS:				**UNPROTECTED SHIPS:**			
Pelorus	2,135	5,000	8	Torch	960	1,100	6
				Alert	960	1,100	6
				Phœnix	1,050	1,100	6
				Algerine	1,050	1,100	6
Torpedo Boat Destroyers 30 No.	various			Torpedo Boat Destroyers 24 No.			

THE NAVAL WORKS BILL.

The following memorandum introduces the Bill :—

"In the schedule of the Bill the estimate for Keyham Dockyard Extension has been increased from £1,920,000 to £3,175,000.

The original estimate was given as the approximate cost of an outline plan which was made before obtaining the necessary borings and other *data*, and before preparing the plans and sections which were required for framing a definite estimate.

As soon as funds were available the necessary borings and other preliminary operations were commenced, to ascertain the depth and nature of the rock and to obtain *data* on which to prepare a design. The original outline plan was also modified; the length of No. 5 dock and of the tidal basin was increased, and a greater depth of water was provided over the sills and entrances and alongside the wharf walls. The modified plan was placed before the House of Commons early in 1895, but at that date the scheme as regards the details of the foundations was still incomplete, and the final plans and sections were only finished some months later. Of the revised estimate of £3,175,000, about £820,000 is due to the additions made to the original outline plan, and to the provision of a sum of £175,000 for fixed machinery of a permanent character. The remaining excess over the original estimate is due to the fact that reliable *data* were not available when that estimate was prepared, and that the great depth at which the rock is met with in places necessitates a large outlay on the underwater foundations.

The estimate for Hong-kong has been increased by £30,000 to carry out the arrangement made with the Colonial authorities. An additional sum of £20,000 has been provided for fixed machinery as in the case of Keyham.

The item for superintendence and miscellaneous charges has been taken as 5 per cent. on the estimates for the works.

In the first item of the schedule the different works in connection with the formation of the enclosed harbour at Gibraltar have been added together to form a single item, but no change has been made in the estimate of the total cost.

The estimate for Dover Harbour is subject to revision when the

necessary preliminary works have been completed and plans prepared. The survey is being actively pushed forward."

The schedule gives the following heads of proposed expenditure :—

Works. 1.	Total Estimated Cost. 2.	Expenditure up to Mar. 31, 1895. 3.	Estimated Expenditure from April 1, 1895, to March 31, 1896. 4.	To be provided under this Act. 5.	Expected Date of Completion. 6.
	£	£	£	£	
(*a*) Enclosure and defence of Harbours:					
Gibraltar . . .	1,074,000	24,148	123,000	300,000	1899–1900
Portland . . .	650,000*	—	50,000	200,000	1900–1
Dover . . .	1,920,000†	—	—	150,000	1905–6
(*b*) Adapting Naval Ports to present needs of Fleet:					
Deepening harbours and approaches .	960,000	98,979	268,000	300,000	1898–9
Keyham Dockyard extension (including £175,000 for fixed machinery) . .	3,175,000	350	10,000	500,000	1903–4
Portsmouth Docks .	375,000	101,165	200,000	74,000	1896–7
Gibraltar Dockyard extension (including £63,000 for fixed machinery) . .	2,674,000	3,779	60,000	300,000	1899–1900
Hong-Kong Dockyard extension (including £20,000 for fixed machinery) . .	340,000	—	—	80,000	1900–1
(*c*) Naval Barracks, &c.:					
Chatham Naval Barracks . . .	390,000	2,845	1,000	200,000	1898–9
Portsmouth Naval Barracks . . .	595,000	—	—	150,000	1900–1
Keyham Naval Barracks . . .	160,000	—	—	50,000	1899–1900
Chatham Naval Hospital	341,000	—	—	100,000	1899–1900
Walmer Marine Depôt	20,000	—	15,000	5,000	1896–7
Keyham Engineers' College . . .	30,000	—	5,000	25,000	1896–7
Dartmouth College for Naval Cadets . .	196,000	—	—	60,000	1899–1900
Magazines (including £25,000 for fixed machinery) . .	485,000	—	—	150,000	1899–1900
(*d*) Superintendence and miscellaneous charges. . .	655,000	—	17,000	106,000	—
	14,040,000	231,266	749,000	2,750,000	—

* An expenditure of £40 543 was incurred during 1893–4 and 1894–5 in erecting dolphins on the line of the breakwater, and was charged to Vote 10 in those years. This is an addition to the estimate of £650,000.

† Subject to revision when the survey is completed.

French Navy Estimates for the Years 1896 and 1895.

Cap.	Heads of Expenditure.	Credits proposed for the year 1896.	Credits granted for the year 1895.
		£	£
	PERSONNEL.		
1	Admiralty Office	115,533*	61,179
2	Navy Pay	1,676,946	1,676,134
3	Marines	519,539	517,566
4	Gendarmerie Maritime	31,196	31,653
5	Inspection of Administrative Services	10,647	10,349
6	Construction Staff	72,448	81,825
7	Administrative Staff	261,904	299,231
8	Medical and Religious Staff	82,800	85,036
9	Fisheries and Navigation	25,728	——
	LABOUR.		
	Wages—		
10	Shipbuilding; new ships; constructions; fitting for sea	468,904	473,610
11	Shipbuilding; repairs	257,217	257,180
12	Armaments; construction of new guns	45,831	45,831
13	Armaments; repairs	57,878	55,878
14	Works	37,453	40,012
15	Victualling	20,294	18,894
16	Master-attendants' and Storekeepers' Departments	238,276	255,976
17	Miscellaneous	14,127	14,670
	MATÉRIEL.		
	Stores and Supplies—		
18	Admiralty	9,872	9,472
19	Ships fitting for sea; repairs	573,038	532,673
	Carried forward	£4,519,631	£4,467,199

* This increase is due to the inclusion of a sum of £54,465 for *officiers et agents des divers corps de la Marine détachés a Paris.*

Cap.	Heads of Expenditure.	Credits proposed for the year 1896.	Credits granted for the year 1895.
		£	£
	Brought forward . .	4,519,631	4,467,199
	MATÉRIEL—*continued.*		
	Stores and Supplies—*continued.*		
20	Shipbuilding; contracts for new ships .	1,257,200	1,339,760
	Supplementary for ditto . . .	28,000	140,000
21	Shipbuilding; new ships; conversions; fitting for sea	1,382,540	1,080,000
22	Armaments; manufacture of new guns .	279,973	280,000
	Supplementary for ditto . . .	——	40,000
23	Armaments; powder, ammunition and repairs	508,946	576,000
24	Torpedoes	75,353	154,487
25	Works; new and large alterations. .	183,615	176,167
	Ditto Supplementary for Defence of Military Ports	200,000	200,000
26	Works; repairs	55,080	53,200
27	Clothing	194,789*	204,316*
28	Victualling.	901,832	949,575
29	Barracks	26,082	39,722
30	Medical science, art and religion . .	67,433	63,661
31	Machinery	181,950	256,565
32	Fuel and Lighting	31,681	31,681
33	Office Furniture	41,742	42,541
	MISCELLANEOUS.		
34	Travelling expenses and freight . .	106,040	110,134
35	Allowance for lodging	153,944	155,744
36	Charitable and subscriptions . . .	51,212	51,649
37	Pensions to Seamen	376,452	394,939
38	Secret Service	4,000	4,000
39	Miscellaneous	9,601	10,300
	Total . . .	£10,637,096	£10,821,640

N.B.—The credits *proposed* for 1896 amounted to £10,904,596, in respect of which the above sum of £10,637,096 was passed by the Budget Committee.

* Includes £5,992 in 1895, and £400 in 1896 for colonial medals.

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1896.—BUILDING IN DOCKYARDS.

Class.	Names of Ships.	Where Building.	Date of Commencement.	Probable Date of Completion.	Total Estimated Cost.	Expenditure proposed for 1896.
					£	£
Battleships	Charles Martel	Brest	April 1891	2nd Quarter 1896	1,092,831	175,648
	Carnot	Toulon	July 1891	Commencement 1897	1,070,088	147,485
	Bouvet	Lorient	Jan. 1893	End 1897	1,100,771	268,866
	Charlemagne	Brest	July 1894	1898	1,096,432	274,640
	Saint-Louis	Lorient	Mar. 1895	End 1899	1,080,997	226,374
	Gaulois	Brest	Jan. 1895	July 1899	1,093,925	230,493
Coast Defence Ironclads	Amiral Tréhouart	Lorient	Oct. 1889	End 1895	593,109	9,180
	Henri IV.	Cherbourg	Sept. 1896	April 1900	626,403	16,760
Armoured Cruisers, First class	Bruix	Rochefort	Nov. 1891	May 1896	409,622	48,719
	Jeanne d'Arc	Toulon	April 1896	Oct. 1899	882,951	100,837
Second-class Protected Cruisers	Pascal	Toulon	Dec. 1893	Jan. 1897	322,321	80,794
	Bugeaud	Cherbourg	April 1892	Mar. 1896	308,651	16,500
	Du Chayla	Cherbourg	Mar. 1894	1897	315,835	90,052
	Cassard	Cherbourg	Oct. 1894	Nov. 1897	318,784	111,253
Third-class Protected Cruisers	Galilée	Rochefort	April 1894	End 1896	208,151	60,033
	Lavoisier	Rochefort	Jan. 1895	„ 1897	202,024	64,505
Torpedo Cruiser	Fleurus	Cherbourg	Mar. 1891	Aug. 1896	128,530	14,703
Sloop	Kersaint	Rochefort	May 1895	April 1898	107,933	35,626
Torpedo-gunboats	Dunois	Cherbourg	Mar. 1896	Sept. 1898	123,384	23,860
	La Hire	Cherbourg	Mar. 1896	Sept. 1898	123,384	23,860
Aviso Transport	Vaucluse	Rochefort	May 1886	End 1900	83,056	..
Submarine Boat	Morse	Cherbourg	..	..	31,366	13,220
	Gustave Zédé	Toulon	..	..	64,927	4,000
TOTAL CONSTRUCTION IN DOCKYARDS				£	11,385,475	2,037,408

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1896.—BUILDING BY CONTRACT.

Class.	Names of Ships.	Contractors.	Date of Contract.	Date of Completion.	Total Estimated Cost.	Expenditure proposed for 1896.
					£	£
Battleships . .	Jauréguiberry .	Soc. de la Médi-terranée . .	April 1891	1896	1,069,536	179,601
	Masséna . . .	Soc. de la Loire	May 1892	end 1897	1,100,397	139,673
Coast Defence Ironclads . .	Bouvines . .	Soc. de la Médi-terranée . .	Dec. 1889	1895	594,640	14,000
	Valmy . . .	Soc. de la Loire	Dec. 1889	1895	578,957	14,000
Armoured Cruisers First-class	D'Entrecasteaux	Soc. de la Médi-terranée . .	Nov. 1893	end 1897	667,739	208,378
	Pothuau . . .	Soc. de la Médi-terranée . .	Jan. 1893	May 1896	453,776	91,377
Fast Cruisers .	Guichen . . .	Soc. de la Loire	Oct. 1895	Aug. 1898	612,345	154,010
	Chateaurenault .	Soc. de la Médi-terranée . .	Oct. 1895	Oct. 1898	606,656	151,709
Second-class Protected Cruisers	Descartes . .	Soc. de la Loire	Aug. 1892	Commence-ment 1896	334,725	66,525
	Catinat . .	Soc. de la Médi-terranée . .	Feb. 1894	Feb. 1898	324,992	87,888
	Protet . . .	Soc. de la Gironde	Aug. 1895	Sept. 1897	323,385	87,100
	D'Assas . . .	Soc. de la Loire	Nov. 1893	Feb. 1897	292,682	75,178
Torpedo Cruiser	Foudre . . .	Soc. de la Gironde	June 1892	Jan. 1896	407,712	72,488
Torpedo Destroyer	Casabianca . .	Soc. de la Gironde	Aug. 1893	Nov. 1895	98,985	24,037
Gunboat . .	Surprise . .	Normand . .	March 1893	Oct. 1895	50,954	4,000
Torpedo Gunboat	M 1	..	..	..	66,602	35,447
Sea-going Torpedo Boats . . .	Aquilon . . .	Normand . .	July 1893	Dec. 1895	26,383	5,565
	Mangini . . .	Soc. de la Loire	Jan. 1895	June 1896	26,525	16,161
	Cyclone (*ex* Ténare) . .	..	..	..	39,380	25,381
	Forban . . .	Normand . .	Jan. 1893	Aug. 1895	38,958	2,800
				Carried forward . . . . £	7,715,329	1,455,318

Programme of New Construction, to be continued or undertaken in 1896.—Building by Contract—*continued.*

Class.	Names of Ships.	Contractors.	Date of Contract.	Date of Completion.	Total Estimated Cost.	Expenditure proposed for 1896.
					£	£
			Brought	forward . .	7,715,329	1,455,318
First-class Torpedo Boats .	No. 201 . . .	Normand . .	June 1895	Nov. 1896	18,000	11,292
	No. 202 . . .	Normand . .	June 1895	Dec. 1896	18,240	8,732
	No. 203 . . .	Normand . .	June 1895	Feb. 1897	18,240	5,932
	No. 204 . . .	Normand . .	June 1895	Mar. 1897	18,240	5,932
	No. 205 . . .	Normand . .	June 1895	May 1897	18,240	3,132
	P 25	..	..	..	16,840	6,960
	P 26	..	..	..	16,840	6,960
Third-class Torpedo Boats (for carrying on board ship) .	D	..	..	..	5,544	4,864
	E	..	..	..	5,544	4,864
	F	..	..	..	5,544	4,864
	G	..	..	..	5,544	4,864
	H	..	..	..	5,544	4,864
	I	..	..	..	5,544	5,544
	Total Building by Contract				£7,873,233	1,534,122

German Navy Estimates, 1896–97.

ORDINARY PERMANENT ESTIMATES.

	Proposed for 1896–97.	Granted for 1895–96.
	£	£
Naval Cabinet and Chief Command Department	1,965	1,840
Imperial Naval Office	47,372	46,884
Observatories	14,087	13,840
Salaries, Wages, &c., Scientific Department	13,874	13,986
Martial Law	1,759	1,622
Divine Service and Schools	3,170	3,197
Military Personnel	631,746	608,345
Maintenance of Ships and Vessels in Commission	606,265	591,312
Victualling	36,283	40,666
Clothing	13,049	12,252
Barrack Administration, Cashiers, and Accountants	64,808	64,066
Lodging Allowance	50,786	49,368
Medical	47,868	46,740
Travelling Expenses, Freight Charges, &c.	85,056	65,555
Training Establishments	10,660	10,551
Dockyard Expenses	825,954	884,189
Ordnance and Fortification	242,131	241,404
Accountant-General's Department	20,452	19,136
Pilotage and Surveying Services	22,624	19,844
Miscellaneous Expenses	29,664	28,283
Total . . . . £	2,769,573	2,763,075

Special Ordinary Estimates.

Shipbuilding Programme, 1896–1897.

For the Construction of—	£
Battleship 1st class Ersatz Preussen, 3rd instalment . . .	150,000
Armoured Cruiser Ersatz Leipzig, 2nd instalment . . .	62,500
Cruiser 2nd class K, 2nd instalment	75,000
" " L, "	75,000
" " Ersatz Freya, 2nd instalment . . .	75,000
Renewal of engines and boilers, 2 ships of Sachsen class, 2nd and final instalment	82,000
Battleship 1st class Ersatz Friedrich der Grosse, 1st instalment .	50,000
Cruiser 2nd class M, 1st instalment	87,500
" " N, "	87.500
" 4th " G, "	25,000
One Torpedo Division boat, 1st instalment	43,650
Repair of Torpedo-boats, "	90,000
Fitting out a Guardship for Constantinople	17,500
Renewal of engines and boilers of ships, 3 and 4, Sachsen class, 1st instalment	41,000
Total	£961.650

Summary.

——	Proposed for 1896–97.	Granted for 1895–96.
	£	£
Ordinary Permanent Estimates	2,769,573	2,763,075
Shipbuilding	961,650	792,800
Armaments and Torpedo equipment . . .	359.250	254,370
Other Items	115,280	123,287
Extraordinary Estimates (exclusive of sum contributed to the Ordinary Estimates)	166,315	150,435
Total . . . . £	4,372,068	4,083,967*

* As compared with £4,318,125 proposed.

Italian Estimates, 1896-97.

Navy Estimates.—Financial Year, 1st July, 1896, to 30th June, 1897.

Ordinary Expenditure—General Expenses.

	1896-7.	1895-6.
	£	£
Admiralty	40,960	41,960
Expenditure on various services connected with the Mercantile Marine	61,017	133,230
Total . . £	101,977	175,190

Expenditure for Naval Services.

	1896-7.	1895-6.
Ships fitting out, in reserve and completing	201,600	229,680*
General Staff of the Navy	134,000	127,897
Corps of Constructors	45,480	43,040
Commissariat Service	35,640	36,065
Medical Service	26,483	25,963
Wages—Men	474,000	443,200
Gratuities	28,304	33,000
Assistants to Constructors	48,577	43,611
Accountants	46,277	34,812
Police	10,760	10,760
Telegraph Service	5,920	6,207
Telegraph Materials	7,400	7,400
Provisions	273,000	275,520*
Lighting	7,841	8,241*
Hospital Services	17,820	17,620
Honorary Distinctions	560	560
Fuel	189,840	163,840
Salaries and Wages—Workshops and Fortifications	5,904	6,064
Training Establishments	14,552	15,655
Naval Academy	4,640	5,600
Scientific Services—*Personnel*	1,384	1,384
" " *Matériel*	11,200	10,400
Law Charges	1,200	1,200
Transport	23,000	22,000
Materials for repair of Ships	270,400	258,400
Labour for same	217,104	225,800
Carried forward . . . . £	2,102,886	2,053,919

* These figures are taken from the most recent estimates, and differ from those given in last year's *Annual*.

——	1896-7.	1895-6.
	£	£
Brought forward	2,102,886	2,053,919
Guns, Torpedoes and Small Arms	356,000	369,600
Labour for construction and repairs of Armaments	74,461	82,000
Works Department—Repairs	72,000	65,000
Construction and Completion of the following Vessels, viz.: Battleships: Ammiraglio di Saint Bon, at Venice; Emanuele Filiberto, at Castellamare. Cruisers: Puglia at Taranto. 2nd Class Armoured Cruisers: Carlo Alberto, at Spezia; Vettor Pisani, at Naples; Giuseppe Garibaldi, by Messrs. Ansaldo; Varese, by Messrs. Orlando; and another vessel. A Cruiser of the 6th class. Torpedo-boat Destroyers. Sea-going Torpedo Boats. Small Craft	880,000	912,000
Total £	3,485,347	3,482,519

EXTRAORDINARY EXPENDITURE.

	£	£
Half Pay	1,000	1,040
Mercantile Marine—Construction at Naples	2,000	3,800
Coast Defence	4,000	4,000
Fortifications, Maddalena	8,000	8,000
Torpedoes	40,000	40,000
Total £	54,000	55,800

SUMMARY.

	£	£
Admiralty and Mercantile Marine	101,977	175,190
Naval Services	3,485,347	3,482,519
Extraordinary Expenditure	54,000	55,800
Grand Totals £	3,641,324	3,713,509

Russian Navy Estimates, 1896.

CALCULATED AT £1 = 9 Roubles.

——	1896.	1895.
	£	£
Central Administration	201,532	203.161
Rewards, Pensions, Education of Children	49,058	47,946
Naval Schools	71,813	67,931
Medical	96,640	96,461
Navy Pay	401,673	397,753
Provisions	92,853	113,349
Clothing	146,633	152,556
Navigation	1,012,289	799,421
Hydrographic Office	69,360	58,480
Guns, Torpedoes	722,196	663,123
Construction	2,033,386	2,120,604
Workshops and Offices	375,759	350,239
Hire, Maintenance, Construction, and Repair of Buildings .	475,601	405,236
Religion	69,778	53,222
Exchange on Sveaborg expenditure	9,219	13,540
Fittings of Port Alexander III. and Construction of Dock at Vladivostok	333,333	377,256
Conversion of Guns.	81,000	36,000
Expenditure on account of Estimates for 1897 . . .	19,354	42,634
Sundries	179,189	103,700
Total . . . . £	6,440,666	6,102,612

United States Navy Estimates, 1896 and 1897.

Calculated at £1 = $5.

Detailed objects of Expenditure and Appropriations.	Estimates, 1896.	Appropriations, 1896 (current Year).	Estimates, 1897.
General Establishment—	£	£	£
Pay of the Navy . . .	1,494,570	1,529,866	1,570,174
Pay, miscellaneous . .	48,000	48,000	52,000
Contingent Navy . .	1,400	1,400	1,400
Bureau of Yards and Docks—			
Ordinary Expenses . .	161,182	161,182	164,275
Public Works . . .	208,962	160,815	259,038
Bureau of Navigation—			
Ordinary Expenses . .	61,450	31,400	57,950
Naval Academy . . .	40,023	39,923	46,206
Bureau of Equipment. . .	261,805	261,925	268,754
Bureau of Ordnance . . .	325,376	113,964	353,438
Bureau of Construction . .	203,995	194,994	408,094
Bureau of Steam Engineering .	232,580	177,580	241,880
Bureau of Supplies and Accounts	257,516	257,516	289,506
Bureau of Medicine and Surgery.	25,360	25,360	27,440
Marine Corps—			
Pay Department . . .	140,164	139,129	138,094
Quartermaster's Department.	57,758	53,844	53,444
Naval Observatory . . .	18,400	4,400	2,860
Total running Expenses .	3,538,541	3,201,298	3,931,553
Increase, Navy—			
Bureau of Equipment . .	28,500	25,000	57,500
Bureau of Ordnance . .	1,047,534	967,534	791,040
Construction and Machinery	1,575,844	1,672,970	1,079,135
Total increase, Navy .	2,651,878	2,665,504	1,927,675
Grand Total . . .	£6,190,419	£5,866,802	£5,862,228

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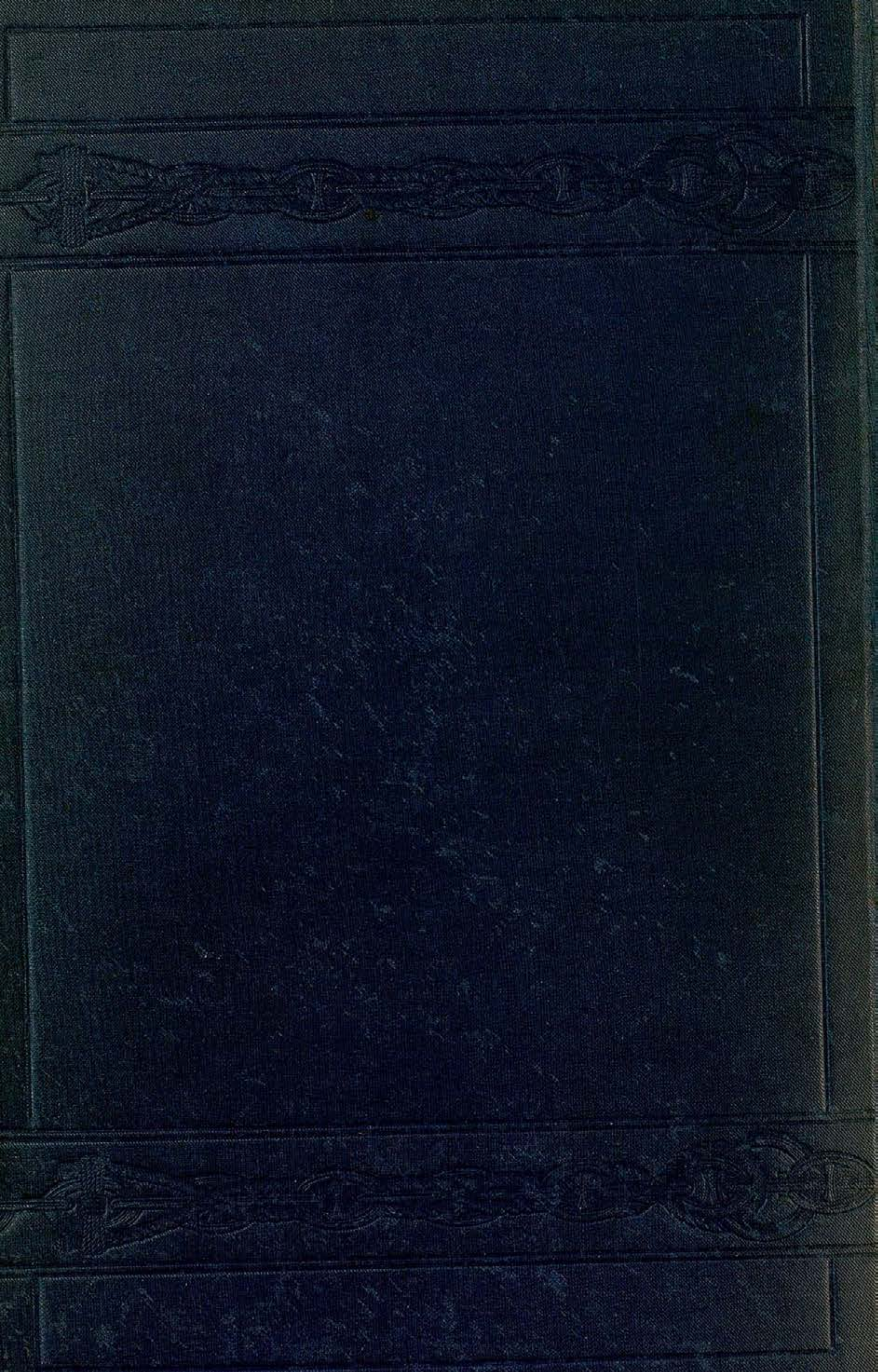
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LONDON:
PRINTED BY WILLIAM CLOWES AND SONS, LIMITED,
STAMFORD STREET AND CHARING CROSS.



THE NAVAL ANNUAL

T. A. BRASSEY

1896

J. GRIFFIN & Co.
PORTSMOUTH

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TENTH YEAR OF PUBLICATION

J. GRIFFIN & Co. PORTSMOUTH